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OF THE DISSEMINATION OF PLANTS.

[From the French of Monsieur F. Brisseau Mirbel.]

By dissemination, we mean to express the spontaneous dispersion of the seeds of the vegetable creation; an event, which, while it brings to a close the yearly round of the vegetative functions of the individual, becomes the means of giving perpetuity to its race. When completed, the organs of the plant in which existence surpasses one year, tend visibly to a state of inactivity, and in that where this concludes with the year, to decay; being then in fact the first stage of dissolution. When we see the fruit separate from the parent stem, its seams begin to open, the ligatures of the seed detach themselves from the placenta, we are not to place these appearances to the account of the energy of the vital principle, but, on the contrary, to view them as the certain indications of its having ceased in that portion of the vegetable, where they occur. Fruit undergoes the destiny of the leaf in autumn, and is quickly reduced within the control of those laws which govern all inorganic matter. If of a succulent, pulpy nature, the fluids ferment and turn sour, the texture collapses, and the whole is dissolved by putrefaction; if of a ligneous, dry consistence, it follows precisely the course of the wood or the leaf, in which vegetation has ceased.

In animals, the affection they bear their offspring, the instinct they are endued with for its protection and succour, their strength, their courage, their address, are all so many means of ensuring the perpetuity of their races; but to vegetables, sensation and the sources of spontaneous movement, have been denied; and yet even here we see countless races appear before us on each revolving year, such as they appeared in the first days of their formation. Let us turn our attention to the causes of this wonderful stability in the races of vegetables.

The most efficient is without doubt the prodigious fecundity they are endowed with. Sir Kenelm Digby tells us, that the fathers of the congregation of La Doctrine Chrétienne at Paris, had in their possession, about the year 1660, a single barley-plant with 45 straws, producing in the aggregate 18000 corns of barley. Ray counted 32000 seeds in the heads of one plant of poppy, and 360,000 on one tobacco-plant. Dodart recounts of an elm, that it produced 529,000 seeds. Yet none of those vegetables are among those of the foremost ranks, in the degrees of fecundity. The number of seeds borne by a plant of Begonia, or Vanilla, but above all by a fern, confounds calculation.

Although many kinds, like those of angelica, fraxinella, and coffee, quickly spoil, and require to be sown almost as soon as ripe, yet the far greater proportion preserve the germinating faculty for years and even for ages. Home sowed, with success, barley that had been gathered for 140 years. Wheat has been discovered in subterraneous hoards, which had been lost and forgotten for time out of mind, in as perfect a state as the day it was reaped.

Insects, birds, and four footed animals are the great destroyers of seeds; yet their abundance is such as prevails over the voracity of their consumers; while some are defended from all risk by the hardness of their coverings, or the thorns which arm them, or the acrid and corrosive juices with which they are impregnated.

Spontaneous dissemination favourable to the development of individual plants, by preventing the too great accumulation of seed within a too narrow compass, is carried on in various ways. In the balsam, catchfly, fraxinella, sand-box-tree, &c. the valves of the seed-vessel open with a spring that projects the contents to a distance from the parent-plant. The gourd of the spirting cucumber, by a contraction which takes place at the moment of its fall, darts out the seed along with a corrosive fluid, by a vent formed as it quits the stalk. The seed of the wood-sorrel is contained in an extensile arillus or separate pouch, which dilates as the seed-vessel grows, but at last the power of extension ceases in the pouch, when it bursts and shoots out the seeds by an elastic effort. Plants of a lower degree, in the scale of organization, such as mushrooms, have their peculiar means of dissemination of the particles destined for their reproduction. For instance, some of the species of Peziza impart a vibratory motion to the cap or cover which bears their seed when that is ripe. Puff-balls, also of the mushroom-tribe, burst at the top like the water of a volcano, and the seed is in such quantity, and so fine, that when it escapes it has the appearance of smoke. The capsules of ferns likewise open with a spring, or effect of their contraction in drying up when ripe. A like cause gives motion to the cilia, or inner fringe which surrounds the urns or seed-vessels of mosses. But although such partial phenomena may attract our curiosity, they act only a very subordinate part in the grand total of dissemination. There are other more general and powerful causes to be mentioned in this place.

Many seeds are as fine and volatile as the dust of the Anther; the winds carry these away to scatter them on the plain, the mountain, the building, and in the very depth of the cavern. No place seems closed against the intrusion of the impalpable seeds of the various sorts of moulds (mucores.)

Heavier seeds and fruits are furnished with wings, which support them in the air, and serve to waft them through great distances. The seed-vessel of the elm is surrounded by a circular membraneous wing; that of the ash is terminated by one that is oblong. The keys, or seed-vessel of the maple, has two large side-wings. The seeds of the fir, the cedar, and the larch are furnished with a wing of great fineness. The peduncle of the capsule of the lime-tree adheres to a kind of broad bracte, which plays the part of wings.

The seeds of syngenesious plants are furnished with a feathery crown, or aigrette, and look like small shuttle-cocks. The separate threads that compose this aigrette, distending as they dry, serve as levers to lift the seed from the involucre that holds it, and when out, as a parachute to prevent it coming to the ground, and to buoy it in the air.

Linnæus suspects that the Erigeron *canadense* came through the air from America to Europe, not at all an impossible thing. When once that syngenesious plant has found its way into any quarter, it is sure to dispense and sow itself round the whole neighbourhood.

The funiculus (a cord which attaches the seed to its receptacle) of the dogs-bane, swallowwort, periploca, &c. the calyx of several of the valerians and scabiouses, form of themselves elegant aigrettes, resembling those of the seed of the syngenesious plants.

Seeds are often carried by eddies of winds far from the spot on which they grew. Whirlwinds have been known to scatter over the southern coast of Spain, those that had ripened on the northern coast of Africa.

Some fruits are closed hermetically, and so constructed as to swim on the water. These are carried to every distance by torrents and rivers, as well as the sea itself. Cocoa-nuts, casheu-nuts, and the pods of the mimosa *scandens*, sometimes of the length of two yards, with many other fruits of the tropical regions, are cast upon the shores of Norway, in a state to vegetate, did the climate permit.

Regular currents transport the large double cocoa-nut of the Sechelles, to the coast of Malabar, at the distance of 400 leagues from whence it was produced. Fruits brought by the sea have sometimes discovered to uncivilized nations the existence of those islands which lie to the windward of their country. By such tokens Columbus, in the search of the American continent, was apprized that he was not far distant from the land of which he had prognosticated the existence.

Linnæus remarks, that animals cooperate with great effect in the dissemination of seed.

The squirrel and cross-bill, are both very fond of the seed of the fir; to open the scales of the cones, they strike them against stones, and thus set free and disperse the seed.

Crows, rats, marmots, dormice, convey away seeds to stock their hoards in out of the way places. These form their winter stores, but are often lost or forgotten, while their contents come up in the spring.

Birds swallow the berries, of which they digest only the pulp, but void the stones entire and ready to germinate. It is thus that the thrush and other birds deposit the seed of misletoe on the trees where it is found; and indeed destitute as this is of wings or aigrettes, it could not be disseminated in any other way, for it will not grow on the ground.

The poke of Virginia (phytolacca *decandra*) which was introduced by the Monks of Corbonieng into the neighbourhood of Bordeaux, for the sake of colouring the wine, has been since disseminated by the birds throughout the southern department of France, and in the deepest valleys of the Pyrenees.

The Dutch, with the view of monopolizing the trade of nutmegs, extirpated the trees on those islands which they could not watch so narrowly as the rest; but in a short time these very islands were restocked with nutmeg

trees by the birds; as if nature refused to admit of such encroachment on her rights.

Granivorous quadrupeds disseminate the seed they do not digest. It is known to every one, that horses infect the meadows with new weeds. The fruit of the prickly-seeded scorpion-grass, of olearus or goose-grass, of the wood-samicle, are all provided with small hooks, by which they lay hold of the fleeces of the flock, and accompany its migrations.

There are particular plants, such as the pellitory of the wall, the nettle, and the sorrel, that may be said to seek the society of man, and actually to haunt his footsteps. They spring up along the wall of the village, and even in the streets of the city, they follow the shepherd, and climb the loftiest mountains with him.

Distances, chains of mountains, rivers, the sea itself, are but unavailing barriers to the migration of seed. Climate alone can set bounds to the dispersion of the vegetable races; that only draws the line which these cannot transgress. In process of time, it is probable that most of the plants which grow within the same parallel of latitude will be common to all countries comprised in the entire zone of it; an event which would be one of the greatest blessings resulting from the industry and persevering intercourse of air to all nations. But no human power will ever force the vegetable of the tropic to endure the climate of the poles, nor *vice versa*. Here nature is too strong for man.

Species cannot spontaneously spread themselves from one pole to the other, the intermediate differences of temperature preventing such progress; but we may assist in transporting them, as we have done successfully in various instances. We have already transplanted the eucalypti, the metrosidera, the mimosas, the casuarianæ, and other plants of Terra Australis, into our own soil; while the gardens of Botany Bay are stocked with the fruit trees of Europe.

The dissemination of seed completes the round of vegetation. The shrub and the tree are bared of their foliage; the herb is dried up, and returns to the earth from which it came. That earth appears to us as if stripped for ever of her gay attire, yet countless germs wait but the stated season to re-adorn her with verdure and bloom. Such is the prodigal fertility of nature, that a surface of a thousand times the extent of that of our globe, would not suffice for the seed harvest of a single year, provided the whole was suffered to re-appear; but the destruction of seed is endless, only a small portion escapes to rise again. In no way in our view are the powers of nature and the immutability of its laws more strikingly displayed, than in the successive resurrections of the types of by-gone generations.

ON THE DEATH OF PLANTS.

Plants, like animals, unless destroyed by disease or casualties, are doomed to die of old age.

In many of the *mucores* (plants which constitute mouldiness) byssi, and mushrooms, the verge of life does not extend beyond a few days, or even hours.

The herbaceous plants we call annuals, die of old age considerably within the term of a year. In our climate, their death takes place on the approach of winter. But we are not on that account to conclude, that cold is the primary cause of the event; a milder climate would not have protracted their existence. Plants of this nature, which grow under the line itself, are scarcely longer lived than those which grow in the regions bordering on the poles. In both situations they perish when the propagation of the species has been secured by the ripening of the seed.

In the herbaceous plants we call biennials, only leaves make their appearance in the first year. These generally die away when the winter comes; in the spring a new foliage, the fore-runner of the flower-stem, is evolved. The

blossom soon appears, this is followed by seed, after which the biennial dies in the same way as the annual.

In the herbaceous plants called perennials, the parts exposed to the action of the light and air, perish every year after they have seeded; but the root survives in the ground, new stems are thrown up in the following spring, and blossom, and seed is again produced.

In the generality of woody plants, death does not supervene until the process of fructification has been repeated for a greater or less number of years. There are trees, however, belonging to the monoctyledonous class, as the sago-tree (sagus farinifera,) the umbrella-tree (corypha umbraculifera,) with immense fan-formed leaves of eight or ten yards in length, which only bear fruit once, and then die; but, on the other hand, in the dicotyledonous class, there are enormous trees, whose existence seems to date from before the records of history, and which, in spite of their antiquity, are loaded in each returning year with blossom and seed.

If we were to view the perennial and the woody plants as simple individuals, as such we should be naturally induced to conclude, that unless destroyed by disease or casualties, they were free from the liability to death from old age; but a due consideration leads us to distinguish in every perennial and woody plant, the new part which actually lives and grows, from the old which has ceased to grow and is dead.

I will state this in a broader way. Plants of this nature, have two modes of propagating their races; one by seeds, the other by a continuous evolution of the like parts.

In the first case, the seed presents us with an embryo-plant, a new and different individual, independent and unconnected with that from which it derived its existence; in the second case, we are presented with a series of individuals, which issue from the surface, the one of the other, in an uninterrupted sequence, and in some instances con-

tinue permanently united. But whether individuals of this description are produced by seed or continuous evolution, it is certain that they escape, in neither case, the influence of time. While the succession of individuals, or what we may call the race, produced in either of the ways, is, on the other hand, as clearly beyond the reach of age, and will endure until destroyed by some extraneous cause.

We will endeavour to show how these general laws apply.

All the parts of the young herbaceous annual are susceptible of enlargement; the cells of the tubes, at first very small, are soon after extended in every way; in process of time, their membranous walls, fortified by the absorption of nutritious juices, grow thicker, and lose by degrees their original pliancy. The membranes once hardened, excitement ceases to be produced, and the vital functions are at an end; nourishment is no longer drawn, growth is at a stand, and the plant, unable to resist the ceaseless attacks of the external agents employed by nature for its destruction, decays in a short time.

Similar causes induce similar results in the stems of the herbaceous perennials; but there the root is regenerated by a succession of continuous evolutions.

By renewals of the same nature, the life of shrubs and trees proceeds. In these the *liber* or inner bark represents the herbaceous plant, and has like that only a short period of vegetative existence. For when vegetation revives in the woody plant on the return of spring, it is because a new liber, endowed with all the properties of a young herbaceous plant, has replaced under the cortex or rind the liber of the preceding year, which has hardened and become wood.

The yews of Surry, which are supposed to have stood from the time of Julius Cæsar, and are now two yards in diameter; the cedars on Mount Lebanon, nine yards in girth, from the measurement of the learned Labillardiere; the fig-tree of Malabar, according to Rumphius, usually

from sixteen to seventeen yards round; the stupendous chesnuts on Mount Ætna, one of which, Howell tells us, measured seventeen yards in circumference; the Ceibes of the eastern coast of Africa, of such bulk and height that a single stick is capable of being transformed into a pirogua or sailing vessel, of eighteen or twenty yards from stem to stern, and of three or four in the waist; the baobab of Senegal of ten or twelve yards in girth, and, according to the computation of Adamson, 5 or 6000 years old; all of these, giants as they are, vegetate, as does the smallest bush, solely by the thin herbaceous layer of the liber annually produced at the inner surface of their bark. The concentric layers of preceding liber constitute the mass of the wood, a lifeless skeleton, serving solely to support the new formed parts, and to conduct to them the juices by which they are fed; nor is it even necessary for these functions, that this should be an entire state. Willows and chesnuts, when quite hollow at the heart, still continue to grow with vigour; but in their soundest state, strip them of their bark, and they quickly perish.

Thus reflection teaches us, that the long life of the greater part of trees, and the immortality which at first sight appears to have been imparted to others as well as to the whole of the herbaceous perennial plants, form in reality no exception to the general law which destines every organized individual to perish in determined course; since we see that the old parts of the roots of the herbaceous perennial continue constantly to die away under ground, and are succeeded by new ones, and that the concentric layers which constitute the wood or heart of the trunks of trees, are no other than the accumulated remains of by-gone generations, in which vegetation and life are entirely extinct.

This appears to us the true view of the nature of the life and death of such beings, as are constantly regenerated by the successive evolutions of like continuous parts.

And we may observe, that the liber which is formed on the stem of a tree of centuries old, if the tree has met with no accidental injury to affect its health, enjoys the vegetative power in as full force as the liber which is formed on that of the sapling; and that a sound well-grown scion, from the aged, but healthy tree, affords as good a cutting for propagation as that taken from the young one, so that the the race might be perpetuated by cuttings alone, without the assistance of seeds. From this we are entitled to conclude, that according to the course of nature, the progress of regeneration by continuous evolution would never be arrested, if the overgrown size of the branches and stem, the hardening of the wood, and the obstructions of the channels which permeate it, did not impede the circulation of the sap, and consequently its access to the liber.

In fine, what we call death by old age in a tree, to speak correctly, is the extinction of that portion of a race, which has been carried on by continuous evolution; the inevitable result of an incidental death in the liber occasioned by the privation of nourishment.

The life of trees has been commonly divided into three stages; infancy, maturity, and old age. In the first, the tree increases in strength, from one day to the other; in the second, it maintains itself without sensible gain or loss; in the third, it declines. These stages vary in every species, according to soil, climate, aspect, and the nature of the individual plant. The common oak usually lasts from 6 to 900 years, and the stages of its existence are of about 2 or 300 years each. It has been observed to live longer in a dry than in a wet soil. The same may be said of the chesnut.

Every species in order that it may attain to its due growth, requires a certain temperature to be found within limits of a greater or less extent.

The common oak, the fir, the birch, &c. thrive most towards the north; the ash, the olive-tree, &c. in the

warmest parts of Europe; the baobab, the ceiba, and the palm, flourish and become robust no where but between the tropics.

According to Sir Humphrey Davy, the respective quantities of carbon, furnished by different woods, afford a tolerably exact scale wherewith to measure their longevities. Those in which carbonic and earthy substances abound, are the most lasting; and those in which the largest proportion of gaseous element is found, are the least so. This rule may hold good in regard to our indigenous trees; but I doubt whether the baobab, the ceiba, and many other tropical trees, the wood of which is of a loose and soft texture, will afford from masses of equal size, the same proportion of carbon as our oaks, chesnuts, or elms, although they grow to a much greater age.

Sir Humphrey Davy is also of opinion, that trees of the same species grow to a more advanced period in the north than in the south, as cold guards against fermentation and dissolution of parts; but every tree lives the longest when it is in that climate which is the best adapted to its nature. Sir Humphrey's opinion would be unquestionable, if the vegetable species in view were organized so as to be adapted to grow in all the climates of the globe, and it was then found that their duration was constantly greater towards the poles than towards the line. I do not doubt, that more oaks of a great age, and more firs also, are found in the north than in the south of Europe; but it is, on the other hand, beyond a doubt, that the ashes of Calabria and Sicily are longer lived than those of Prussia and Great Britain. These are phenomena which depend upon the particular nature of species, and of this subject we know nothing.

In proportion as a tree increases in size, the vessels of its ligneous layers become obstructed, and the sap circulates with less freedom; hence absorption and secretion decrease after youth, in proportion as the bulk of the tree

is enlarged. The liber is less vigorous; the buds and roots become fewer and feebler; the branches wither; the stem decays at the head; water settles in the injured parts; the wood moulders away. Ere long, the new liber, the annual herbaceous part of woody vegetables, loses the power of completing its regeneration, new parts are no longer evolved, and the tree perishes.

The tree after death is overrun by pucciniæ, mucores, sphæriæ, and other cryptogamous plants; it attracts and imbibes moisture, no longer as formerly by the absorbing power of its organs, but by the hygrometrical property it derives from its porous conformation, and the chemical action of the elements which compose it; the oxygen of the atmosphere consumes a part of its substance, some water is generated, carbonic acid gas is disengaged; and the rest is resolved into vegetable mould (humus,) a fat, brown, powdery substance, eminently fertile, in which we find in different proportions the same elements of those of which vegetables are composed, and which have the faculty of decomposing air and combining with its oxygen.

It is thus the career of plants is terminated in the order of things. The earth they adorned in the period of vegetation, is fertilized by their remains; germs impregnated with new life have already been confided to its bosom, ready to supply the by-gone generations, and through the death of individuals, an unfading youth is secured to the race.

Norfolk County, June 16th, 1818.

[To the Corresponding Secretary.]

DEAR SIR,

It is to be regretted that the Farmers in the neighbourhood of the town of Boston are less careful of their or-

chards than of vegetables in their gardens. I am led to this remark from having for many years observed the apple trees in almost every direction, to be very much neglected, in many places, they are in a state of rapid decay, and in others so badly pruned, that the young trees will soon be in the same situation with the older ones.

The cause of this evil is, as I conceive, three fold,—first,—the season that our farmers choose for lopping their apple trees is a bad one, they generally begin in March, when there is still much wet and frosty weather, of no activity in the sap of the tree; of course the water and frost together soon destroy the fresh bark round the cut, and decay begins at once. This season is chosen in many instances because the farmer can spare the time better in March, than in April and May; and in some, because people have an idea that trees must not be cut in summer, believing them more liable to injury then, than in the early parts of the season, but the reverse of this is the fact, as may be proved by any man who will try the experiment on one or two trees in his orchard. Let a farmer take two small apple trees, and prune one in March, and the other in May, and put compost on neither, and he will soon see the difference, the one lopped in May will, if properly pruned, heal over sound and fair, and cover the whole wound in a much less time than the one lopped in March, provided the wounds be of equal size; and of course the tree will be preserved in a sound state much longer, because the wood is exposed to the effects of wet and frost much less time, and the cause of its decay is removed or shut out; but whether trees be pruned in *March*, or *May*, is of little consequence, if they are not *properly pruned.*

Second.—The old practice of *hacking* and mutilating apple trees in a manner ruinous to their orchard, is still, I am sorry to see, followed by some men who are otherwise good husbandmen. As I have witnessed the fact this

spring from a man who is esteemed one of our best farmers, and who is certainly one of the best men, I have thought a communication on the subject might be serviceable to *some*, if not to all who read it. The same reasons which apply to the apple tree, apply to all other trees, except those which are liable to gum; but in a less degree, as the apple tree wood is more subject to canker than almost any other.

It may be objected to pruning in May, on two grounds, one, that the trees are then in blossom, and the other, that in going over the orchards, which are generally mowing land, it would injure the grass; to the *first* I answer that, any time before the 15th of May the blossoms are not open, and of course it cannot injure those that are *not* cut off, and it is of no consequence whether the limbs be cut off before or after the blossom shows itself. To the *second* I should concede the point, that where the orchard is intended to be mowed, it will be better to prune late in April, or as late as it can be done without injury to the grass, and if the trees, or any of them are to be grafted, both operations may be carried on at the same time, and early in May is the best time for grafting apples.

The old and the middle aged apple trees in the neighbourhood of Boston are in a worse state than any other place I am acquainted with. This is the more surprising, because our farmers derive a great revenue from their orchards when in good order, and they are not insensible to their worth. The cause then must be a want of proper information on the subject, and not from negligent habits.

It is a univeral practice among the old farmers, or old *fashioned* farmers, to mount the tree with a hatchet or bill-hook, and hack off any branch which is in a state of decay, or which is misplaced, about six or eight inches from its insertion, leaving a stump to rot, and to operate as a conductor of the water, frost, and canker into the

mother branch in which it grew, or into the body of the tree, according to its situation. This was done originally from an idea that if you cut close to the mother branch, or to the body of the tree, the rot or canker will seize more readily on its trunk, than if cut at a distance, and that the tree will decay the sooner. The practise has been followed without reflection, and without reason by many; but the errour is so obvious, that any man of observation must see it yearly; and any one who doubts may satisfy himself in one season of the incorrectness of the practice, by making his experiments on a young tree.

Whenever the tree is pruned, whether it be in March, April, or May, let the farmer take his pruning *saw* and *sharp* knife or hatchet into the tree. When he has fixed on the limb to be lopped off, he should, if it is large or heavy, first cut it off at some distance from its insertion, to prevent its weight in falling from lacerating the bark at the shoulder whence your final cut is to be; because, this leaves an opening for water to get under the bark, and cannot be easily healed. You may now saw the stump close to the branch from which it proceeds with safety; or if it be a portion of a branch which is to be lopped off, the cut should be down to a sound healthy lateral branch growing from the same limb; or if the limb to be cut off proceeds from the body or trunk of the tree, then it should be sawed close to the shaft. The wood in all cases should be smoothed over, and the edges of the bark carefully pared with your knife or hatchet, so that the water will run off the wound. If the cut be made on a lateral branch, it should be sawed obliquely or slanting so as to leave no dead wood, or wood to die, and in all cases the cut should be on a sound and healthy part of the tree. If the branch on which it is cut, is a healthy and vigorous one, it will heal without difficulty, if pruned the last of April or beginning of May, but if in March, the wound

should be covered with a compost; but if the wound be large, so as to require several seasons before it can heal entirely, it will be better to apply the compost, whether it be pruned in March or later. The smaller the wound, the more easily it is healed; the large ones however may be perfectly restored if you cut the rotten wood and dead bark away, smooth over the edge of the sound bark, and cover the whole with the compost I shall mention. It is true, that in very old rotten trees the experiment is not worth making; but in trees that are still essentially sound, but which have been lopped in the disadvantageous manner before mentioned, it is not too late to try your skill, and you may be sure of restoring your orchards to health and fruitfulness. Cut off all the old stumps down to the sound healthy wood, either on the mother branch, or on the body of the tree, and pare off all the dead or cankered bark, and then apply the compost so as to cover the *whole* wound, and your tree will recover itself in a great measure, if not altogether. Let those who do not choose to go to the labour and expense of restoring a whole orchard, begin with one or two trees, and if they live, they will repent that they did not try it on all. But if the farmers will bestow as much time and labour on this object, as it deserves, they will soon feel the benefits and advantage of the change.

Thirdly. Our Farmers are in the habit of encouraging luxuriant upright branches, to the great injury of the natural horizontal fruit bearing branches, these are very properly called *glutton* branches, because they consume the sap which would otherwise go into the lateral and fruit-bearing branches, and in the course of a few years they leave the fruit branches decaying and decayed,—the Farmer then resorts to his ax, cuts away the dead and dying wood, and leaves the glutton in full possession of all the nourishment which the roots afford; but in return this

voracious member of the orchard gives no fruit until many years, and then they are of an inferior quality.

To prevent this, the cultivator should suppress all the stiff, upright shoots the first year they appear, by cutting them off *close* to the branch from which they issue, taking care not to leave the shoulder of the shoot, as he will in such case have the same duty to perform again; but if the shoulder of the glutton be cut away, the sap will be distributed among the lateral fruit bearing branches, which will be kept in vigour, and continue in a healthful bearing state.

By attention to the foregoing rules, apple trees may be kept in health and soundness fifty years longer than if treated with the severity and harshness they now receive; and the orchard will yield its fruit in greater abundance, and with greater certainty while it lasts.

The compost best suited to cover the wounds of all trees, is a composition of tar, bees-wax and red ochre boiled or simmered for half an hour or twenty minutes together, the proportions which I have used are, a pint of tar into which I put a piece of bees wax as big as an English walnut; when these are incorporated, I scatter a small quantity of pulverized red ochre, say half a gill, and stir them well together while boiling hot or simmering. When this compost is cool, it should be stiff enough to resist the heat of the sun sufficiently to prevent its running, and yet be soft enough to be applied to the wound with a small flat smooth stick, it will last two years at least without requiring to be renewed; it yields to the sap as it issues from under the bark round the wound to cover it, while it continues to protect both the wood and the edge of the bark from water, and of course from decay.

With respect I remain, your's, &c.

A FELLOW LABOURER IN THE VINEYARD.

ON RECLAIMING LOW OR MEADOW LAND.

[To the Corresponding Secretary.]

It is the duty of every man, whatever may be his occupation, to endeavour to do something *every year* that shall add to the value of *his property* and to his stock *of knowledge*, and thus not only to become a blessing to his own family and connexions but to that community of which he is a member, and to whom he is under many obligations.—It is kindly ordered by Providence, that in trying to attain one of these objects we generally gain the other.—Thus we naturally expect to see that industry, care, system, knowledge, competency, opulence go hand in hand. The merchant, if a man of a good share of common sense, discretion and good fortune, not only increases his estate from year to year, but adds to his knowledge of his particular business, and of commerce in general. The mechanic, while he is honestly and busily engaged in his trade, gains a good living at least, and very frequently a handsome estate, and at the same time adds greatly to his stock of skill,—noticing every improvement in the mechanic arts, as suggested by his own practice and observation, or the remarks and inventions of others. The navigator, if a man of common talents and application, rarely returns from a voyage without an increase of knowledge. He becomes a better seaman, a better agent, knows more of the world, and all this without diminishing, in the smallest degree, his exertions for his own family and fortune.—And shall the farmer alone be stationary? shall the farmer sit down contented, through a long life, and find himself at last at the very point from which he started, as respects both his property and his information? shall agriculture, the surest foundation of the wealth and happiness of nations, be so degraded—be the only calling *in our country*, that does not improve our wealth and our knowledge as a people? It must not be. The farmer, if

he be a good man, will always be respected; if an industrious and careful man, blessed with health, will always have a sufficiency if not an abundance; if a man of common education and observation, will increase, not in agricultural knowledge only, but in his stock of general information.

But waving these general remarks, my intention is, at this time, to confine my observations to the common farmers of our country, and inquire *whether it is not in the power of every one, without any expense but that of a little time, to do something every year to render his farm of more value than it was the year before.* If this can be done, while at the same time his crops and necessary business do not suffer for want of seasonable care, is it not a duty he owes to himself, his family and his country to do it, and should he not be pleased with such hints as may serve to assist him in this laudable purpose?—*what then I ask, can the common farmer, that respectable and numerous class of society, do conveniently and without much expense, to increase yearly the value of their estates, and at the same time pay all necessary attention to the common business of the farm?*

A farmers work, it is said, is never done. So much the better. No man ought ever to be idle. To be idle is generally to be vicious. But though the farmer's work is never done, yet there are seasons of the year when he is not driven, and when he can conveniently turn from the usual work of his farm, and do something by way of improvement. There is scarcely a farmer in Massachusetts who could not, in the course of the year, by a little attention to system, in the disposal of his time, make a piece of stone wall, drain and reclaim a piece of low land, clear up a piece of upland overrun with bushes, plant the seeds of apples, pears, peaches, cherries, &c.—set out and ingraft a few fruit trees, perhaps set out an orchard; increase, by new methods, his usual stock of manure, by

collecting mud, leaves, sods and other articles, by improving his breed of cattle, and, in short, by doing a great number of things which are but too commonly omitted to be done, but which would add very considerably to the value and income of the farm. On each of these improvements much might be said, but my present purpose is to recommend to our farming brethren, such especially who live near a market, where land is of course more valuable, *to reclaim a piece of low or meadow-land, however small, every year*, while he has any, and thus be enabled to get crops, and large crops too, of good English hay, instead of the vile, coarse stuff, which now grows upon it, and which is not worth the trouble of mowing, and is calculated, not to nourish cattle, but barely to keep them alive. The way to do this is so simple, and so well known to every farmer, that it seems needless to attempt to describe it, and yet so little of it is done, though almost all our farms have a portion of this low land, that a description cannot be deemed unimportant, if it be only to call up the attention of people, by placing the subject before them anew.

Almost every farm has more or less of what we here call *meadow-land*, land which is boggy, or full of hassacs, or of cranberry vines, &c. The grass is usually mown for fodder, but is as I have said, excessively mean and coarse. It is scarcely worth the labour of mowing.—Now to render such land the very best on the farm, requires some work it is true, but no labor is better rewarded, and it may be done at a season of the year when the farmer has, if ever, a little leisure, I mean immediately after haying is over; let him then ditch and drain this low land in the best way he can. In most cases there will be found an outlet, and then nothing but making a ditch through the middle is necessary, with here and there a cross ditch, as the case may require. If the surrounding higher grounds be full of springs a ditch, may be necessary round the

edges of the meadow to communicate with the main one. These ditches often serve in place of a fence, which is an important circumstance. After thus ditching and leading off the water, plough up the nearest knoll, or high spot that can be found, whether gravel or sand, or both, and cast it into the meadow, dropping a load in a place, so that after being spread it will cover the land intirely over a few inches thick, say from three to six, as may be convenient, *the thicker the better*. None of the old soil or grass will now be seen. When thus prepared, sow it immediatetly with grass seed clover and herdsgrass. After this it will be better to bush it in, but this is not essential, as the rains will cause the seed to be covered sufficiently. This is all the first year. If done after haying it will probably be in September, and the grass seeds will come up before cold weather. September is the best month, not only because it is a time of most leisure, and a proper season for sowing the seed, but it is generally the driest time in the year, and the cart can be driven on with ease, and the cattle are in heart. Should the work not be done in season to sow seed so as to have it sprout before winter, the sowing may be omitted till spring. It is nearly if not quite as good. The mud thrown out, in forming the ditches, can be taken to the barnyard for manure, or at a proper time it can be spread over the gravel on the spot. In either case it has considerable value. The summer following there may not be expected a great crop, though of greater value than it ever was before. The grass will get well rooted and the foundation laid for an abundant crop for years to come. The next autumn, that is one year after gravelling, there should be a topdressing of mixed or compost manure, and the summer following there will be as fine a crop of clover and herdsgrass, probably, as could be wished for, and in the following years nothing will be necessary but a topdressing of dung every now and then, and if the coarse grass is not intirely subdued, a lit-

more gravel or sand or soil of any kind. Land which is thus reclaimed, I might almost say, created, has many advantages over common land, and may justly be deemed on the whole the most valuable on a farm. It will never need ploughing, nor will it ever be likely to suffer for want of rain. In a very wet season it may suffer a little. There will be crop enough, but it will be a little coarser. It rarely happens, however, that we have too much rain for our grass crops.

I am aware, that to many people, who have done nothing in this way, this labor of converting meadow lands into English grass land, may seem too great, and even more than it is worth, when done. But let them try it. If they find it to turn out as well as mine has done, they will not regret the effort. I have reduced fourteen or fifteen acres in this way; a little every year as I have found it convenient. The land had been mown for generations, and the crop was of the mean kind I have mentioned. It was not worth twenty cents the hundred. Possibly there might have been a ton to the acre, but I doubt it. Cattle would not eat it if they could get any thing else.—On this land, I have for years cut from one and a half to two tons the acre, of excellent clover and herdsgrass, and believe that in future it will do as well, and require less care than any good land I have. The cost of gravelling and sowing an acre, I cannot estimate. It depends on circumstances, such as the nearness of the gravel, and the necessary thickness of the covering, some grounds requiring more than others. There is considerable labour in it no doubt, but it is to be considered that we do not hire it done as a job. It is done with our own teams, after the meadow hay is off, when the farming business is not pressing, and on such days as can be spared. It must be remembered too, that it makes very valuable land of what was of little or no value before. It is a gain of so many acres, so that whatever the expense or labour may

be we must view it as so much purchase money for the best of land; and this I may venture to say, I believe, that two or three crops will amply repay all the expense, and thus leave the farmer, after that time, as much richer as the value of the land so reclaimed.

I have introduced this subject, because I think it has been overlooked by a great many of our worthy farmers much to their disadvantage, and I have to request that all such will make a small beginning this fall, by way of trial. If they will I am persuaded they will follow it up, as one of the most profitable ways of employing a part of the month of September or later in autumn, or even in winter, as may be found most convenient.

A MIDDLESEX FARMER.

RECEIPT FOR PREPARING SEED-WHEAT, SO AS TO SECURE IT AGAINST SMUT, SO FAR AS SMUT DEPENDS ON THE SEED.

If the seed be *spotted*, it should first be washed in several clear waters, till the black spots disappear. It is then to be steeped in the liquor immediately to be mentioned.

If the seed be not spotted, it is merely to be soaked in the following liquor:—Make some ley, by putting four pints of water to every pound of wood-ashes, according to the quantity wanted. If to 100 pounds of ashes, 400 pints (or 50 gallons) of water be added, the produce, when strained, will be 30 gallons of ley; to which must be added 15 pounds of quick lime. This will prepare nearly 17 bushels of wheat for sowing.

This liquor, when wanted for use, must be placed in a large tub, and made as hot as the naked hand can bear it. The seed being put into baskets, must now be plunged into it, and stirred with a stick; after which the liquor must be

drained away. The seed must next be laid on a floor, till dry enough to be sowed. If stirred from time to time with a shovel, to prevent its heating, it may be kept without damage for a month or even a year.

The above receipt was published in France about 60 years ago by M. Tillet, and recommended by M. Du Hamel; and still appears to retain its reputation.

Mr. Tull (in a work translated from English into French by M. Du Hamel, some years previously to M. Tillet's publication,) had recommended steeping the seed, in *pure* salt and water; and then adding lime to it. Mr. Tull adopted the brine upon the authority of a story, that about 70 years before he wrote, a cargo of foreign wheat had been sunk near Bristol; and being taken away at ebb tides, was sown and produced healthy crops, when the rest of the English wheat was smutty. Wood-ashes are cheaper than salt, and perhaps more efficacious.

M. Tillet made the following experiment to prove the advantage of his liquor. He prepared 14 beds of sandy earth, mixed with flints; each 22 feet long and five wide, and separated only by foot paths; and sowed five rows of wheat in each bed, on March 29, 1759. The seed was throughout, the same; but for some of the beds, it was prepared as above; for others, it was sown without any preparation; and for others, it was purposely blackened with smut. Messrs. De Jussieu and Le Monnier being selected as commissioners to note the issue, took 45 ears, gathered (in two handfuls) from the wheat artificially smutted; of which one ear only was free from smut. They found every thing healthy, as far as they examined, in the other beds. In some rows, the smutted grain had been introduced for a certain portion of the length, and then the rows were completed out of the other parcels of seed; yet the produce uniformly answered with precision to the seed sown. Thus a close neighbourhood in the grown plants did not communicate the smut, though so much appeared

to depend on the state of the seeds themselves. It is unfortunate, that M. Tillet did not, by his liquor, purge the smut from smutty seed on this occasion, in order that his experiment might have appeared complete. He did this however on other occasions, on a large scale, and with different soils.

The four French gentlemen named here, were members of the French Academy of Sciences; and all of them respectable, and even celebrated.

To the above receipt, the following hints may be added.

If any of the seeds swim, when first plunged into the pure water, let them immediately be removed; since such seeds generally produce smutty grain. If left to become heavy by taking in water, they often sink to the bottom, to mix with the other grain. Whoever wishes also to avoid smut, must neither sow in wet land, nor during very wet weather.

SENEX.

ESSAY ON SMUT IN WHEAT.

Long as *Smut in Wheat* has existed in New England and some of the Middle States, as well as in various parts of the old world; and great as has been the damage done by it to crops, to flour at the mill, and to seed; yet the evil in general has neither been fully understood, nor fully prevented; nor yet have the remedies which the case has admitted after the attack has taken place, been fully applied. As the District of Maine is formed to be the principal domestic granary of New England, it is proper, after learning all that has been said or done on this subject, that its inhabitants should seek to add to this knowledge; and afterwards diligently conform their practice to the growing state of their information.

The theories offered as to the *cause* of smut, are not yet in a state to afford the necessary satisfaction.—For example. Some have considered smut as proceeding from *very small insects*. But every insect discovered about a wheat plant, is not therefore either a direct or an indirect cause of smut: since insects may habitually visit the wheat plant, in order to feed upon its coarser parts; or if they produce a disease in it, (and they certainly may produce many,) it may be wholly unlike smut. So easy are mistakes on this subject, that a fly which devours the Hessian wheat-fly in its maggot shape, has been considered as the *offspring* of the very animal on which it feeds; notwithstanding the Hessian fly has an origin of its own, which is now fully discovered, and notwithstanding the devouring insect has never been proved to taste vegetable food. Before we consider, therefore, a given insect as the cause of smut, we should obtain proofs of the fact from good observers stationed in different countries, and properly aided with glasses.—Again: a *parasitic* plant* fixing itself upon the wheat plant, has been spoken of as the possible cause of smut; there being various instances of parasitic plants destroying more or less of the mother-plant on which they grow. But when an opinion of this kind shall be as well supported as that of Sir Joseph Banks, who has proved that a multitude of parasitic funguses or mushrooms sometimes destroy wheat plants, in a mode however totally different from that exhibited by smut; we may pay an atten-

* The word *parasitic* or *parasitical* in a short compass expresses a very important and frequent occurrence in nature. It comes from the word *parasite;* which not only signifies a flatterer, but one who is supported by another. The former word is constantly applied by naturalists either to small vegetables drawing their food out of *living* vegetables on which they reside, or to small animals doing the like by living animals, or living plants. The death of the parts, or of the party yielding the support, often follows.—In the above case, an animal which is parasitic to a *plant*, has another animal parasitic to itself. M. de Beauvois thinks, that he lately discovered in France a parasitic fungus growing on a parasitic plant, which had attached itself to living hemp in a wet season.

tion to this suggestion which it does not at present claim.—It is a third opinion, that smut is a mere *disease*; and M. Aimen (correspondent of the French Academy of Sciences) held, that it commences with the blossom and prevents the proper formation of the kernel. But notwithstanding that M. Aimen professed to have traced its progress, and was assisted with glasses, as well as with the advice of M. Jussieu, (a celebrated French naturalist;) and that the opinion carries with it considerable probability; yet it still requires the confirmation of other observers in other places, before we adopt it without reserve.—Again: the *black dust* belonging to smut has been held as the *cause* of the propagation of smut. At the same time, however, others consider this black dust merely as the *effect* of smut. M. Aimen attributes this dust to the corruption of certain juices of the plant, originally intended to form the flour (or farina) of the kernel; of which we probably see a correspondent example when certain plumb trees produce puff-balls in the place of fruit. M. Aimen attempted to justify this second opinion of his, by adding water to these juices, and also to the dust of smut; and then comparing the two. But to render this hypothesis more convincing, pure dust should be carefully taken from the *heart* of the kernel, and be rubbed upon pure seed; in order to avoid the eggs, seeds, and infectious matter, which may be supposed to be attached to the *outside* of the wheat.

Such are a part of the theories offered respecting the nature and formation of smut in wheat; but nothing yet named on this subject can be held as properly demonstrated.—We have still, it is true, to look to seasons, soils, and other circumstances, either as being principals or assistants in the production or progress of the mischief which is the subject of our inquiry. But as we have nothing to report under this head beyond the simple fact, that some of them seem to have an *influence* here, they will be noticed in another place.

In the mean time, we shall state some of the *principles*, upon which it seems reasonable that the preparations for guarding seed wheat against smut should be conducted, in order to correspond with the various speculations prevailing as to the causes of smut.—The principles then seem to be these:

To *remove* or to *destroy* all dangerous animals or dangerous vegetables, as also all contagious matter, connected with the seed wheat, yet without injuring the wheat itself; also to render the seed wheat nauseous and offensive, that insects from without may be unwilling to visit it; to accomplish this likewise by processes which are simple, and little liable to accidents, mistakes, or abuses; to let none of the materials employed in them be dear, scarce, or poisonous; to adopt methods, if possible, which shall end in giving a stimulus to the growing of the wheat; to let nothing remain on the wheat kernels, which shall make them stick to each other, and thus embarrass the sower; and lastly, to let the seeds be left in such a state, as to admit of their being kept for a time without spoiling, in case the sowing shall be unexpectedly delayed, or the vegetation in the ground be checked by the weather.*—Nothing has been said here of the expedient of applying *boiling water* to the seed; as this great heat probably injures the chit (or germ) of many of the kernels first receiving the water. Besides, an oven may be made to give a much more mild and regular heat; the washing of the seed taking place in the first instance, or following the removal of the seed from the oven.—Moderate warmth, however, is important in every instance where liquors are employed to prepare seed wheat, that the materials may better penetrate; but when the *steeping in*

* An attention to the safe keeping of the prepared wheat seed, according to the late Mr. Somerville of Scotland, is often very important, where powerful materials have been employed to act upon it. See communications to the British Board of Agriculture.—2. 219—222.

many cases must be brief, in proportion to the warmth.—The same rule as to warmth applies to waters which are used in succession for *removing* the impurities of seed wheat, merely by *washing*. But nothing, in this case, should prevent a New England farmer from putting some of his wood ashes to his water, or even some soft soap, as strengthening the solvent powers of the water. It is said, that M. Tillet originally designed merely to wash his wheat; and added the ley of wood-ashes to enable the water more easily to dissolve the *cement*, by which he supposed that mischievous matters were fastened to the kernel.

As to the materials adopted for destroying minute insects or vegetables, or contagious particles, supposed to be attached to the kernels of seed wheat, (some of which materials have been made into secrets,) though the number of them appears to be considerable, they may in fact all be classed under a few simple heads. They are certain acids, alkalies, or neutral salts; and certain mineral, animal, or vegetable matters, all of which are held to be corrosive, poisonous, or disgusting. Among the latter articles stand arsenic, blue vitriol, pigeons' dung, soot, stale urine, and certain vegetable poisons. From the nature of the human character, whatever is novel and pompous, will stand a chance of being more admired than what is old and simple: but M. Tillet's receipt agrees with more of the *principles* stated above as worthy of our attention on this occasion, than many of the receipts depending on some others of the materials just mentioned. In particular, we may state as to the destructive powers of his method, that those who make observations with microscopes, find that nothing more speedily deprives small insects of life, than the two alkaline mixtures of lime water and wood-ash ley, when strong; and these articles are equally fatal to minute vegetables; and lime is known of old, to be employed to exter-

minate contagion. But to go still nearer to the point; wood-ash ley and lime-water have been found by *experiment* to prepare seed wheat against smut, equally well with *arsenic.** If the simplicity of M. Tillet's receipt should still render it despised, we may use to the farmer, the remark made to the leper Gehazi by his servants: "If the prophet had told thee to do some *great thing*, wouldest thou not have done it; how much *rather then*, when he said to thee *wash* and be clean?"

Notwithstanding the propriety of the farmer's obtaining pure wheat for his seed, we see that his crop will often be smutty in defiance of his care, if he omits to prepare this seed; while on the other hand, impure seed sown without any preparation, will sometimes produce for him sound crops. Mr. Aimen gives both ways a close example of the general fact, where no preparation was used. He says that in Guienne (in the south of France,) little smut was seen in the year 1754; yet from the good seed obtained from the crop of 1754, smutty wheat was produced in 1755; and from the bad seed yielded from the crop of 1755 came good wheat in 1756.

Hence we must look to something as having influence here besides the *apparent* state of the seed. What is known on this subject (including what regards *secret* causes of taint attacking the seed) may partly be gathered from the following *Rules* which are either collected from practical observers, or built upon regular experiments. The rules are *twelve* in number, and will probably be found interesting, when their bearings on other subjects in agriculture are taken into account.

1*st Rule.*—Wheat is not to be sown on ground which has borne smutty wheat in the year preceding. M. de Gonfreville has apparently confirmed this to us by an experiment;—for after sowing sound wheat, both prepared

* See Young's Annals of Agriculture, 10. 231.

and unprepared, and then covering it with earth, he strewed smutty materials on the *surface* of the ground over one portion of each parcel. The produce of that portion over which he strewed his materials, beeame smutty; while the remainder of each parcel, over which no such materials were strewed, continued free from smut.

2*d Rule.*—Manure tainted with smut is not to be applied to wheat land; it being supposed that a taint may be given to straw, &c. not only in the field and during the act of threshing, but by means of the winnowing machine and of the *sweepings* of a smutty threshing floor.—It is said however by some (and apparently with reason) that such straw, &c. loses its power of conveying infection, after it has been rotted; and this will be particularly true, if the straw has been mixed with *lime* and made into a compost manure.

3*d Rule.*—When manure is used, it is not to be spread too thickly; and hence it follows, that even when only a due proportion of manure is brought on the land, care must be taken to distribute it very equally. The reason of this rule seems to be, that though an excess of dung makes the leaf and stem of the wheat plant very rank, yet it lessens both the comparative size and comparative produce of the *ear;* which from its state of imperfection, (becomes as in similar cases) open to the reception of smut. The plants, on the other hand, in parts which are without dung, become exposed to smut from their *general* weakness.

4*th Rule.*—Pure seed is not to be left within the reach of infectious materials.—This caution extends not only to avoiding the use of a threshing floor employed for smutty wheat; but that of tainted sacks, tainted casks, and tainted vessel for measuring wheat.—This infectious matter, however, is not always discoverable by its effects in the *dust* taken from *granaries* in which wheat is preserved; for this dust sometimes has been applied to wheat without infecting it.—In truth, wheat easily collects harmless dust;

and among the rest, the *down* from that end of the wheat kernel which contains the chit or germ. Besides, when infectious materials have for a certain period been separated from wheat, they may possibly lose their infecting power; which if proved to be the case by fair experiment, will confirm the opinion, that old seed is least liable to smut, provided it be still in a state to produce vigorous plants.

5th Rule.—The sowing of wheat should take place early, that the seed may ripen early, smut frequently attending late crops. But it is not merely late *sowing* that is mischievous; for every thing is dangerous which delays the ripening of the crop. Of this description is the practice sometimes seen in cold climates, of feeding down a field of green wheat with cattle, in the hope, that new shoots will be thrown up to ripen themselves at a later period. The same practice, however, is supposed to be harmless in some of the hot countries of the East, where there is always sun enough left to *quicken* the ripening of the grain; or if evil follows, it may be an evil different from smut, which is not understood to be common in such regions. In confirmation of this latter fact, Mr. Tull remarks (what, to a certain degree, is proved by our experience in the United States,) that smut chiefly belongs to cold countries; in which he probably included the mountainous regions of hot countries.—And yet we may observe by the way, that wheat and other similar grains are generally sown early enough in hot countries, to permit them to ripen before the scorching heats commence; that is, in a comparatively cool season. Indeed the experience of Great Britain and Ireland manifests in *some* seasons the possibility of wheat being ripened, when it has scarcely enjoyed a single gleam of sunshine in the latter stages of its growth: just as we see late apples and pears ripen in our dark and cool closets and cellars.

6th Rule.—The seed ought to be well conditioned; for seed which is light, unripe, *mouldy*, very much bruised,

worm eaten, or otherwise imperfect or injured, has, in general, a tendency to produce smutty wheat, and especially in smutty seasons. But since plump wheat will always be valued on account of its producing a large proportion of flour to a small proportion of bran; many will think it right to attempt to obtain such grain by means of *plump seed*. A controversy, however, exists as to the necessity of sowing plump seed; Sir Joseph Banks and other respectable and experienced persons, urging that all the large kernels should be sent to the mill, since small and healthy kernels will supply good plants at a less cost; a bushel of such seed containing most kernels, and therefore yielding a greater number of plants. The late Dr. Hutton of Edinburgh, (the celebrated mineralogist) likewise has related, that after he had impoverished the leaves and stems of wheat by sowing it repeatedly from its own seed, during a certain period, on the same bed in his garden; he immediately obtained plants of the proper dimensions and quality, by sowing the last raised seed in a fresh bed. Mr. Tull on the other hand affirmed, that "the largest grained plump fat wheat, is more liable to smuttiness, than small grained thin wheat." Garden fruits also, which (in consequence of nature being overstrained in some of the parts concerned in fructification) are made to arrive at an extraordinary bulk, often have imperfect seeds; as fat animals are often bad breeders.—Perhaps, therefore, it will be found a wise compromise on this subject to have the seeds of a *natural* size, and so to manage them by culture, as to make them produce kernels larger than themselves.—However, the present rule chiefly regards *damaged* kernels, and not their size.

7th Rule.—None but good land should be employed for wheat, and particularly it should be land admitting of early crops.—Hence wet land should never be applied to wheat, till its wetness is cured.

8*th Rule.*—Wheat is not to be sown in very wet weather, even when the soil is dry.—This is a rule which rests on several reasons. If the seed be prepared by steeping, water may dissolve or wash off the preparation. If it be not so prepared, the wet may convey to the seed a contagion which was before buried quietly within the soil. Great rains also lay bare the seed, and expose it to various evils and accidents. Such rains also wash down part of the soil above, to fill up the hollow spaces in the soil below, and thus (as the phrase is) *un-till* the ground, and make it so heavy, as to bear ploughing better than sowing. Lastly, much wet injures those parts of the wheat plant which are concerned in forming the seed, by producing rankness in the rest of the plant; and thence lays them open to the attack of smut.

9*th Rule.*—A change of seed is equally recommended by Mr. Tull and by M. Aimen; and the rule has this in its favour, that few who are wise will procure worse seed to sow, than that which they possess already.

10*th Rule.*—The purest portions of the wheat plants in a crop, should be set apart for seed; and when ripe, these plants should be harvested by themselves, and also threshed by themselves, as soon as possible; and the seed which is obtained, after it has been first washed with some protecting preparation (like that proposed by M. Aimen) and thoroughly dried, should be preserved apart in a safe place.—This Rule will commonly prove more important than the preceding one.

11*th Rule.*—The thick sowing of wheat is improper; for the double reason, that it produces feeble plants and dampness, both of which encourage smut.

12*th Rule.*—No favourable moment for sowing is to be lost, nor is any unfavourable moment to be adopted, from a supposed necessity of paying attention to the state of the moon. The prejudice of certain worthy men, on this subject, arises in general, not from their own experience, but

from traditions delivered from our ancestors, who lived in times so little enlightened, that the moon, stars, and planets were thought to govern the fates and fortunes of men themselves, as well as the success of their crops. The prejudice in question, has been kept alive by many, in consequence of habit, and of their desire of being on the *safe side;* or, if observation has at any time been appealed to, it was to note (as Lord Bacon says of these cases,) only when their rule hit, and not when it missed.—M. Gonfreville, however (about the years 1759 and 1760) divided a piece of land 150 feet long and 50 feet wide, into 22 plots, which were thrown into three classes, each plot having 12 rows, and exhibiting from three to six experiments. His chief object was to prove, that certain circumstances had no share in occasioning smut in wheat; and he found in particular, that the result of his experiments was in nothing changed by the variations in the *moon* or in the *wind*; which he thence recommends us to disregard. Those who think differently, should produce a set of equally extensive experiments on the other side. Indeed it is now the prevailing opinion of enlightened men in most civilized countries, that our observation in Agriculture, as regards the heavens, should chiefly be directed to the time of the year, the actual state of the weather, and the habits of the climate of each place. If any one of the heavenly bodies deserves especial regard in Agriculture, it is surely the Sun, which forms and defines our seasons. As to the wind, Solomon says, "He that observeth the wind shall not sow, and he that regardeth the clouds shall not reap;" thus intimating that we are *to seize the moment before us*, and especially in climates like ours, where all our useful moments are short. But either to delay our proceedings or to hasten them for cold *moon-shine*, is not to keep pace with the solid improvements of the age; but to follow our forefathers in a point of *avowed* superstition. It is better in short to run the chance of sowing twice, than to be certain of sowing either too soon or too late.

So much for our twelve Rules taken *separately:* a part of which will be found to rest on general principles of good farming, and tend to save us from *other* mischiefs besides smut.

Viewing these twelve Rules, and the remarks which introduced them, *collectively*, they next seem to furnish three conclusions. 1st. That our suspicions as to the causes and occasions of smut ought to be directed to a variety of quarters. 2d. That it ought to be a fundamental object to make the wheat plant healthy in all its parts, and particularly in its ear and in its seed. 3d. That from the appearance and disappearance of smut, according to circumstances, we may conjecture, that the rudiments of smut are always at hand and capable of rapid multiplication; thus furnishing a double motive for purifying and protecting our seed.

On the subject of wheat, when under the operation of wet seasons, we may make the following statement from Dr. Darwin, as given in his Phytologia. This writer conceives, that the male parts of the flowers of the wheat may burst their cells by means of wet, and throw their fertilizing dust on the earth, or otherwise injure it; or that the rain may wash it away; and that for want of a proper impregnation, the germ, or female part, may become putrid, as in the case of the addled egg. Hence he favoured the plan of sowing together *two kinds of wheat*, flowering at different periods; that if the fertilizing dust of one should be lost, a due quantity (for there is always a surplus of it) might be obtained from the other.--How long the female part of the flower may remain capable of impregnation, after the season of the fertilizing dust of its own male has passed away, has probably been the subject of no experiment yet made known to our agriculturalists. Besides, every concern of this kind ought to be submitted to the test of varied and multiplied attention and trials, at separate times and in different countries.

But to proceed with our general subject.—We shall now suppose that smut has actually *arisen in wheat*, and inquire how it is to be *prevented from injuring our flour at the mill.*

We have already seen one method to be practised on this occasion, which is, that of putting the wheat into water, removing the light kernels, and then washing the remainder. This may be done with water, having in it a little soap or wood-ash ley, to increase its cleansing qualities; and after this has been well washed off by pure water, a *thorough drying* must take place, before the wheat is sent to the mill.—But as this process is troublesome, on account of the difficulty of drying wheat, especially in winter or in wet or cloudy weather; and as washing has been thought to affect the appearance of the grain when offered for sale, the following methods have been proposed as substitutes.

1*st Method.*—Sand has been mixed with wheat on the threshing floor, to give room for friction from the flail. But there is both trouble in obtaining and in using the sand, and then again in separating it.

2*d Method.*—M. L'Hommedieu, Vice-President of the Agricultural Society of New York, gives the following as an English receipt.—Take some of the reddest marle or clay, dry it in an oven, reduce it to fine powder, and then sift a pint of it at the time of threshing over every dozen of sheaves, (chiefly at the end where the ears lie.) The red dust, it is pretended, will "predominate and keep the smut from taking effect," and itself be blown away during the winnowing. (See Transactions of the New York Agricultural Society, I. 314.)

3*d Method.*—Mr. Davis, who was patronized by the conductor of the farm of George III., used a *powder* for smutty wheat, which was said to operate speedily, and to be more effectual than mere friction, and to clean a *load* of wheat at the expense of a dollar and a half.—Smutted

wheat, valued at 35 shillings a quarter, with mere friction, became worth 40; but was "still only fit for *blues*, of which gingerbread is made;" while a sample, fully wrought with Mr. Davis' powder, became worth about 54. The English Board of Agriculture much praised this discovery. (See their Communications, II. 230.

4th Method.—The French sometimes take a quilt that is very woolly, on which half a bushel of wheat being laid, the quilt is forcibly shaken by two persons, when the light smutty grain is said to stick to the quilt, leaving the other wheat also brighter. After cleaning the quilt, fresh parcels are shaken. (See Maison Rustique: Edition 1775.)

5th Method.—This also is French; and consists in *turning the wheat round* at the mill in a rolling (or cylindrical) screen of pierced sheet-iron, having the rough side inwards.—In this drum-sieve (or *crible a tambour,*) which revolves nearly horizontally, the grain becomes more or less cleansed from its external impurities; but the work is slow. The rolling screen of wire, used in our good flour-mills for separating foul seeds, &c. from wheat, would operate (if its motion were continued) in a similar manner; the down growing over the germ of the kernel of the wheat, being actually removed by it, to the benefit of the flour. But the action in both cases is too feeble for carrying away smut; which lying originally *within* the rind or skin of the wheat, cannot be removed till the rind is forcibly broken.

6th Method.—This consists in employing against smut the small mill-stones used for converting common barley into pearl barley. The pearl barley is prepared by grinding off, not only the coat or rind of the common barley, but part of its kernel; (for some of the coat lies in the longitudinal indent of the kernel.)—The smutted wheat, however, is rubbed for a shorter time than the barley; but the smut, not being immediately carried off, passes in some degree from one kernel to another; this process also is slow, and the stones require frequent cleansing.

7th Method.—The smutty grains are here *crushed* by making the wheat pass between two sets of cylindrical surfaces of thick sheet-iron, placed perpendicularly, one within the other, and almost touching; the inner set revolving, but the outer remaining still.—These surfaces act like graters on the wheat, by having *holes* punched in them; the holes of the one surface pointing to those in the other; and through the two sets of holes passes a strong *current of air* produced by a winnow (revolving on a perpendicular axis) occupying the hollow of the inner cylinder. But for the smut to be *blown away*, as fast as released, the grain must be *dry*. This cheap and rapid operation instantly puts the blackest wheat in a condition to be made into superfine flour: and it also brightens wheat for sale. Sometimes the operation requires to be repeated. The wheat, however, ought to be screened before it enters the smut machine, to remove foreign substances mixed with it; and as the wheat drops from the smut-machine into the trough below, a second winnow must separate from it the light and broken kernels. We must not forget also to direct some of the holes in the external cylinder outwards, to let the smut escape with ease.

Such are the methods by which wheat has hitherto been cleansed from smut, as far as an extensive inquiry has brought them to light.

This Essay on Smutty Wheat will now be closed, with two reflections.

1st. The subject is of immense importance. The United States annually export to the amount of many millions of dollars in flour and in other products of wheat, besides consuming a much larger amount at home and on board their vessels. We saw above, that by removing smut from wheat, its value directly rose 50 per cent; and flour is thus made more agreeable and wholesome in bread and in pastry. But by preventing smut altogether, we shall prevent a dimunition of our crops, much mortification,

and some trouble and expense.—We repeat then, that the subject is immensely important, especially to an agricultural and growing nation.

2d. The name of *smut* has by some been applied to blast in wheat; and it may properly be so applied, as well as to the subject of this Essay, if each evil be considered as arising from the corruption or perversion of the healthy sap. Indeed M. du Hamel, in his Elements of Agriculture, classes both under the name of *diseases which render the wheat black.*—It is unfortunate that we have not adopted one of the French names for what we have above called smut; for they term it not only *charbon*, but *les grains brules*, or *burnt wheat*, the grain seeming to contain within its coat nothing but burnt matter. The *Nielle* of the French, or *blast* (by many called *blight*) attacks not only wheat, but barley, oats, spelt, rye, and various other plants, being a disease which injures their blossoms, and prevents the formation of the kernel. Smut also attacks several plants besides wheat; and according to M. Aimen, the disappointed sap extends the skin of the rye and forms ergot; which agrees with the opinion of M. Vauquelin very recently announced in consequence of a chemical analysis, though contrary to that of a Committee of the Institute of France, who think that ergot is a *parasitic fungus*.

SENEX.

P. S. Mr. Arthur Young, in the tenth edition of his Farmer's Calendar, published in 1815, says, after discussing the subject of smut: "The conclusion which I draw from the whole is, that steeping the seed many hours in a lixivium made of wood-ashes, or in lime-water, may be *relied on for security;* and of these, the *former* appears to be the most effective. The only doubt that can remain is, relative to the propriety of steeping for a longer period than 24 hours."—But it does not appear that Mr. Young *warmed* his liquor.—When we consider, however, this

gentleman's situation, as Editor of Annals of Agriculture, as Secretary of the English Board of Agriculture, as the writer of Agricultural Travels in France and Ireland, which which have much improved the Agriculture of both those countries, and as a very old farmer and author, his testimony is invaluable.

It should have been stated in its place, that we ought carefully to remove the *puff ball* (a species of lycoperdon or mushroom) from wheat land, and indeed from a farm; for M. Aimen found, that pure wheat rubbed with this powder, yielded smutty plants!—*Query.* When Mr. Somerville, in his Essay on the blight and smut of wheat, speaks of smut-balls, does he consider *burnt grain* as a smut-ball?

REVIEW AND TRANSLATION OF A FRENCH PAMPHLET "ON THE APPLICATION OF PLASTER TO ARTIFICIAL MEADOWS, BY MONSIEUR CANOLLE, MEMBER OF THE ELECTORAL COLLEGE IN THE DEPARTMENT OF THE VIENNE, AND OF MANY LEARNED SOCIETIES."

[By the Corresponding Secretary.]

THIS little work, on a subject which is acquiring daily new interest in this state, from the extended, and constantly extending use of plaster, was among the books lately introduced by the Massachusetts Agricultural Society, for the increase of their library.

It was not because the utility of Plaster, that phenomenon in agricultural discoveries, which baffles the skill of the philosopher and chemist, was doubted in this country, but because its use is still too much confined, and because prejudices on the subject prevail with an obstinacy, which no evidence has yet been able to overcome, that the Editors of this work have been at the trouble of translating this little tract.

For twenty years after plaster was found to have renovated the worn-out lands on Connecticut river, it was received as an axiom settled in Agriculture, that gypsum or plaster was of no sort of use on the sea-board. It was in vain, that you urged that it was found to be very useful in some parts of Great Britain, which may be called *all sea-board;* and that it was particularly beneficial in some countries, which lay along the British channel open to the southwest winds, which sweep the Atlantic from the coast of Brazil to the island of Great Britain; or that it had been used with success on Long Island, on the shore; and more recently, on the very margin of the sea, in the District of Maine. It was in vain that we cited to them the unanswerable experiment of the late Ralph Smith, Esq. of Roxbury, who tried it most successfully on old pasture in that town, on which its effects were visible, as he stated, for seven years. Still one or two, or a few persons, having either the misfortune to use bad plaster, or to apply it to lands not suitable to it, or in too small quantities, or to plants which it is not calculated to improve, having failed of success, they not only reject its use, but endeavour to bring it into discredit.

They cannot succeed in preventing its extension, but they may make it more slow than it would otherwise be, and in this way may do some millions of dollars amount of injury to the state.

As this little brochure, or pamphlet, of Monsieur Canolle's, contains most of the necessary rules, or hints, with respect to the use of plaster, we shall not enlarge at present on the subject, but simply state, with great brevity, some maxims, which, though subject to certain exceptions, may be considered as being generally received as true, in all places where plaster is used, and are more particularly advanced by that eminent philosopher, Sir Humphrey Davy.

1st. Plaster is found to be more useful on dry than on wet soils, particularly on gravelly or sandy loams, or on loams which repose on gravel or sand.

2dly. Though the quantity employed by European cultivators is very different, yet it may be assumed as true, that less than three bushels to the acre, would not be esteemed sufficient to produce any visible effects. Some persons with us have abandoned plaster, because one bushel, or a bushel and an half, did not at once change the character of the crop.

3dly. The effects of plaster are chiefly confined to large-leaved plants, such as clover and lucern. Its operation on the finer grasses is scarcely perceptible. It is not used much in Europe on grain, and, we believe, seldom, if ever, on potatoes.

4thly. Although sometimes its effects are speedy, yet, in general, they ought not to be expected till the second year, unless applied in September or October, for the following spring.

5thly. Some lands in other respects, as to dryness, and the nature of the crop calculated for plaster, are not benefitted by it. On analyzing the soil of some such lands, where plaster had failed, Sir Humphrey Davy discovered, that they had already a competent quantity of plaster or gypsum in them; of course, no effect, except an injurious one, that of making the gypsum in excess, could be there expected.

When Monsieur Canolle speaks of *artificial meadows*, he means such as we usually term *mowing lands*, as distinguished from natural wet meadows. The term meadow is generally applied, both in England and France, to all mowing land, or land which is mown, and is put in opposition to, or by way of distinction from, arable or ploughed and pasture land. The translation will be made into the plainest language, adapted to all cultivators or farmers.

TRANSLATION OF M. CANOLLE'S TRACT.

[Introduction by M. Canolle.]

To apply to our meadow lands a manure, which should be efficacious and cheap, and should supply the place of our usual manures, has been the object of my experiments, the result of which I shall now state. The scarcity and dearness of the manures of the country, absorbed chiefly by the culture of the vine [and we may say in this country, of the Indian corn] render meadows, or mowing lands in *this* district [that of Poictiers, in France] of little value. The cultivator purchases, at great expense, the benefit of *hay* for his *stock*, and, in consequence, their number is reduced to what is absolutely necessary for the cultivation of his ploughed lands. Thus, for want of manure, we leave an immense extent of our soil subjected to slight ploughings, and a fallow every third year, scarcely yields a *fourfold* increase. Let us give a value to these barren grounds. Let us augment their produce, and, for this purpose, let us turn them into artificial meadows, or mowing lands, and let us apply to them a substance easy to be procured, little expensive, whose effects are as uniform and as durable as those of our common and most expensive manures.

The application of our home-made manure, upon these dry and barren lands, when in mowing, require an expense, which the produce will not cover, even when your mowing lands are in the most flourishing condition. The following example or parallel, will prove it.

It is well known, that a *boisselée* of land, (or about 200 square toises, which we may compute at one sixth of an acre, which will be exact enough for our present object) converted or turned into mowing ground, cannot be dunged under an expense of seven dollars twenty cents; that the effect of this dunging cannot be perceived more than three

years, and that, during this three years, the crop will not exceed (for this sixth of an acre) 500 weight of hay annually, that is, at the rate of about one ton and an half to the acre.

How can such a crop pay the expense of culture, seed, manure, the interest of the money advanced, and the produce which this same land would have given, if cultivated with fallows in the *usual way*? This will appear by the following statement:—

One sixth of an acre of land hired for thirty cents a year, for four years - - - - - -	$1 20
Taxes at 7 1-2 cents per year - - - - -	30
Expense of culture to put in saintfoin - - -	60
Picking up stones - - - - - - -	20
Seed - - - - - - - - - -	80
Manure and carting do. - - - - -	7 20
	$10 30

Let us suppose, that the sixth of an acre of saintfoin, or clover, gives every year 500 pounds of hay, which does not always happen, and that the saintfoin sells for *five dollars* a thousand weight, or half ton, a thing also very rare, you will only have about seven dollars and fifty cents net produce in three years, and an actual loss of about three dollars on your sixth of an acre of ground. I reckon but three years' harvest, because you can get no produce the first year.

[*Note.* It would seem by this, that in this part of France, they do not lay their lands down to grass with any sort of grain.]—*Editors.*

If, instead of employing a manure, which cost seven dollars twenty cents, for one sixth of an acre, you employ one which costs but one dollar twenty cents for the same land, and which will produce as great an effect as the dearer sort, the benefit will be unequivocal. Instead of expending ten dollars and thirty cents, your cost will be, but four dollars thirty cents, and the loss will be prevented.

There are two principal considerations in estimating manures; the one is their relative value as to effects, and the other is the cost of carriage and spreading. Thus it is clear, that *that* manure is to be preferred, which, with the *least bulk*, produces the most astonishing effects. I speak of *plaster*.

The application of plaster to agriculture, ought not to be reckoned among the number of seducing and fallacious innovations, which theorists have introduced, and which wise farmers distrust with no small reason. The trials which have established its utility and efficacy, have not been made by a small number of adepts, in a privileged garden. This manure has been known for more than forty years. It was first employed in Switzerland, in the year 1768. Its use was soon adopted in Germany, and afterwards in Flanders and France, principally in Alsace, the Lyonnais, and Dauphiny, where it has been regarded by cultivators, as the surest and most powerful agent, or manure for *mowing lands*. Before employing it at large, I chose to make an experiment, and compare its effects with our common manures.

[This French writer omits, in his enumeration of countries in which it has been tried, the United States, where it was introduced nearly forty years since (very much to the honour of our citizens) soon after it was spoken of in Europe. We take this occasion to mention, that the account of this valuable manure, in the Supplement to the British Encyclopœdia, published in 1812, is extremely meagre, and calculated to leave unfavourable impressions. The only reason seems to be, that it had not been much introduced into Scotland. The editors of that work, speak with some doubt of the trials in America, and chiefly quote a very early work of Mr. Powell, of Pennsylvania; but a very little inquiry would have informed them, that it is a staple export from one or two of their provinces, and that the United States now consume many thousand tons annu-

ally, both of the Nova Scotia and French plaster. They suggest a doubt, whether it can be a cheap manure, even if it could be obtained gratis in the countries where it is found. We can only state that a ton, which costs, after it is ground in this country, not more than thirteen or fourteen dollars, is sufficient to manure at least four acres of land. That its effects are supposed to last at least four years, though diminishing after the second, and, of course, the cost of manuring an acre for four years will not exceed three dollars and an half, not much more than it would cost to cart and spread a proper quantity of dung on the same land. How long plaster would continue to operate beneficially without other manures, is a point not yet, we think, sufficiently established.]—*The Editors.*

MONSIEUR CANOLLE'S EXPERIMENTS.—*First Year.*

I caused to be prepared, in the usual manner, ten pieces of land, each one sixth of an acre, making a part of a larger field, which I intended to lay down to lucern grass, [a grass much cultivated in France, in the same way we raise clover.] This field has about a foot of vegetable earth, or earth fit for vegetables, over a bed of red sand, mixed with clay. The ten pieces were sown with lucern, in the spring of 1807. The seed came up well, and during the course of that year, flourished vigorously.

I divided the ten pieces, in 1808, into seven portions or lots, six of which consisted of one sixth of an acre each, and the rest of two thirds of an acre. In the month of February, of this year, I spread upon each of the six portions of one sixth of an acre the necessary quantity of the the usual manure of the country, and kept an account of the expense. This manure was rotten horse dung, dung of sheep and pigeons, soot, ashes and vegetable mould. The quantity of each of these manures, requisite for one sixth of an acre, cost me seven dollars twenty cents, and the plaster for the remaining two thirds of an acre, cost but four

dollars and eighty cents, being but one dollar twenty cents for one sixth of an acre.

The plaster was spread early in April. Now see the effect for the first year. It ought to be remarked, that the year was remarkably dry, and the land was one hundred feet high above the level of a river.

The sixth of an acre, manured with soot, gave 600 pounds of hay.

That with ashes, 450 pounds.

That with sheeps' dung, 400.

That with rotten horse dung, 380.

That with mould, 290.

The least productive piece was that with pigeons' dung, which scarcely gave 200 pounds.

The four pieces of one sixth of an acre each, manured with plaster, gave one ton. Thus the product of the four pieces, manured with *plaster*, which had cost only five dollars, was, within one sixth part, as great as that of the six other equal pieces, the manure of which had cost forty-three dollars.

In 1809, the results of the experiment were different from those of 1808, yet served still further to prove the beneficial effects of plaster. The four parts which had been sown, or manured, with plaster, gave as before, one ton of dry hay (on two-thirds of an acre.) The sixth of an acre, which had been manured with soot, did not give 500 pounds. The other pieces manured as above, gave a much less quantity than the year before. Those that were manured with pigeons' dung and old mould, scarcely gave enough to pay the expense of cutting and curing. Thus, for the year 1809, the advantage remained in favour of the part manured with plaster, which still preserved the same degree of vigour, whilst that manured with soot, which had cost seven dollars twenty cents for a sixth of an acre, and which, the first year, appeared superiour to the plastered land, this year fell below it.

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1810. At the beginning of April, in this year, on visiting my experimental field, I was astonished at the vigour of my grass, which had been plastered, and its contrast with the smallness and feebleness of that which had been manured with pigeons' dung, mould, and ashes. Those which had been manured with soot, horse and sheep's dung, still retained some appearances of vigour, which promised some crop. I came to the aid of my suffering and perishing plants, by sowing over them plaster.

The effect soon became apparent. In less than *three weeks*, the vegetation of these plants equalled that of the part originally treated with plaster, whilst the parts manured with horse dung, soot, and sheep's dung, which I left as before, did not give a crop half equal to that of the year before. They promise me but a feeble supply next year, if I do not attempt to assist them.

The results which I obtained from the trial of plaster in the year 1808, decided me to apply it on a much larger scale.

I have laid down to saintfoin and lucern [two favourite grasses of the French] more than fifty acres, and I have employed no other manure than plaster. The crops I have obtained, have equalled those obtained from lands which have been carefully, and profusely, or liberally manured with the common manures of the country, and I can truly affirm, that the prospect of future crops is as good as can be furnished by the best cultivated mowing lands, treated in the common way. The success has surpassed all my expectations. This experiment has not been lost. The example has been followed by many. I can affirm, that more than 200,000 weight of plaster has been employed in this single district, [not more than the hundredth part of France.

After having shewn, by positive and decisive facts, the efficacy of plaster, I shall proceed to state the process employed, both for the preparation and application of this substance.

The first section, on the importation of plaster into Poictiers, we omit.

SECTION II.—OF BURNING THE PLASTER.

This preparation is *necessary* to render plaster fit for the purposes of agriculture. [Here the author is mistaken, as it is never burnt, we believe, in any part of America, where its use has been more general, and its application more successful, than in any other country. Still as some may choose to try the experiment, and as it may, possibly, improve the quality of the manure, and increase its effects, we shall insert what Monsieur Canolle says on this part of the subject.]

"The action of fire deprives the plaster of its *water* of mineralization, for which it afterwards becomes thirsty, and strives to regain it from the atmosphere. By burning, it becomes much more susceptible of pulverization, and, in this state, reduced to more minute particles, and thus, with the same volume, it will cover a greater extent of ground, and more equally. There are two objects to be attended to in burning plaster, to economize fuel and time. You accomplish the former by employing that which is capable of producing the greatest intensity of heat. That which gives the most flame is to be preferred. Dry cord wood, or faggots, were employed by me, and the cost of fuel was about three dollars to three tons of plaster, or a dollar per ton."

M. Canolle first burnt his plaster in the open air, and it then cost him for fuel, nearly three dollars per ton. After this he made a very simple brick furnace (or it might as well be of stone.) His furnace cost him twelve dollars, and he burnt seven tons of plaster, with two dollars worth of fuel, he made of faggots only. The manner of burning the plaster is very simple, very much the same as that employed in burning lime, and consists in laying the lower tier of stones, consisting of the largest, so as to form an

arch to admit the fuel, and the others are to be so arranged as to admit the flame to pass freely through the whole mass. It requires about eight hours, with a pretty intense flame, to burn it sufficiently. You know when it is fit to be pulverized, and that is, when the pieces of stone in front pulverize easily, which you can ascertain by experiment. The plaster loses in burning about one-fifth of its weight, but it becomes so much more divisible by it, that it will cover one quarter part more land than the same quantity which has not been burnt. Mr. Canolle pulverized his plaster after it was burnt, by beating it with clubs: he also made use of a roller, and afterwards sifted it.

SECTION IV.—CIRCUMSTANCES FAVOURABLE OR UNFAVOURABLE TO THE SUCCESS OF PLASTER OR GRASS LAND.

Plaster acting, or operating chiefly on the absorbent system of plants, its effects are not like those of manures buried in the soil, which act principally on the roots. The latter according to their *particular nature* divide, soften, enrich, warm, or stiffen the soils with which they are mixed. The quantity of plaster spread upon the land is so trifling, that it can have little effect on the soil. I speak from experience. Plaster buried in the earth where saintfoin has been sown, has produced no visible operation; whilst the same quantity of plaster spread over the same surface of saintfoin, has produced the most beautiful vegetation.

From this experience, so uniform in the application of plaster, I am led to believe, that one must consult as well the nature of the soil, as the kinds of plants to which we apply plaster. Thus, whatever may be the soil on which clover, lucern, and saintfoin naturally flourish vigorously, or with that vigour which encourages us to apply manure, there is no risk in trying plaster.

It is to be remarked, that plaster operates on plants in a direct ratio, to the size and number of their leaves. I

have spread plaster on land where saintfoin was mixed with the common grasses which compose our meadows. The growth of the saintfoin and wild honey-suckle has been, beyond comparison, greater than that of the common grasses. It is to this cause I attribute the failure of success on grass ground chiefly filled with common grasses. I have a field of lucern separated from a natural meadow only by a brook. I have greatly increased the lucern by plaster, whilst the effect of a like quantity on the adjoining grass land, was scarcely, if at all, perceptible.

I ought to remark, that the effect of plaster, being to fit the plant for the absorption of moisture, its operation is always greatest on dry or calcareous soils. Upon clayey, or wet lands, it does not operate.

SECTION V.—OF THE PROPER SEASON TO SOW PLASTER.

The greatest quantity of plaster which I have sown, has been in the months of March and April. That which I have sown in December, has produced a great effect; and this year, after the first cutting of my lucern, in the middle of June, perceiving some parts of the field less vigorous, I conjectured it had been overlooked in spreading the plaster. I accordingly applied it, and in fifteen days I had the pleasure to perceive the difference between that part of my land and the rest disappear. I think, however, the winter season the most proper for the sowing of plaster; for if it is spread at a period too near the cutting of the crop, we carry off a part of the plaster with it, which injures the hay, and reduces the quantity of manure. Five hundred parts of boiling water are necessary for the complete solution of one part of plaster, and therefore the plaster should be spread a long time before the crop is cut, in order that it may be all dissolved and absorbed. By employing plaster in the winter season, the plants will start earlier in the spring and more vigorously, and will be thus better able to withstand late frosts. If they are touched with the frost, they are able sooner to recover.

SECTION VI.—OF THE SORT OF WEATHER MOST PROPER IN WHICH TO SPREAD PLASTER.

Plaster ought to be scattered, or sown, in calm weather. In windy weather it is apt to be blown away; and, being spread in too small or unequal qualities, its effects are lost.

A slight mist or rain, by fixing it as it falls on the leaves and stalks of plants, is very favourable for spreading it. Thus, the misty weather of the spring and fall, is to be selected. You may, indeed, spread it in very cold dry weather, if it be calm.

SECTION VII.—OF THE QUANTITY OF PLASTER NECESSARY FOR A GIVEN EXTENT OF LAND.

"In too great quantities it makes the plant shoot too vigorously for its strength, and renders the fodder less nutritive for cattle. It is apt to be weak and lodge, and thus injures the crop by rotting it. In that case it ought to be speedily cut; but, even in that case, the hay is apt to be musty, and is made with great difficulty.

"Applied in too small quantities, its effects are scarcely perceptible, and are of short duration. After various experiments, I have determined that about a pound of well pulverized and burnt plaster, is sufficient for a square toise or, (or thirty-six square feet nearly.") [This would be at the rate of 1200 *pounds to the acre, or, at least, eight or nine bushels.* I have, in all these calculations, only attempted to approximate to those of Monsieur Canolle, because it is not material. It is sufficient to shew, that the plaster, when it is used as a manure in Europe, is applied in quantities far exceeding what are generally used in this country. This may possibly explain the cause of failure in some instances here.

It is not necessary to add M. Canolle's direction for sowing or spreading plaster. The art is well understood with us. It should be sown very much in the same man-

ner in which the small grains and grasses are sown, having reference to the greater quantity of plaster proposed to be distributed. A man used to sowing two bushels of rye to the acre, would soon learn to sow six bushels of plaster on the same quantity of land. As the operation takes but little time, the plaster would be more equally distributed, if it was sown at *twice*. As soon as the workman had finished sowing three bushels, he might go over it again in a different direction, and sow three more. We believe, that our farmers have, as yet, been too scanty and economical in the application of this manure.

It may be thought, that the expense would be too great. Six bushels of plaster would not cost more than four dollars ground, (except the transportation.) If its effects endure, as is pretended, four or five years, what manure can compare with it in cheapness?

It is not pretended, however, that plaster will produce good effects on all soils; and it is to be doubted, whether there is more than one third of the grass land in the state, to which it could be applied with success, perhaps not so much; but it is, certainly, deserving of fair and *patient* trial.

In corroboration of Monsieur Canolle's experience, as to the quantity of plaster necessary for an acre, we cite from the authority of the celebrated Kirwan, one of the best writers on manures, as quoted by the Massachusetts Agricultural Society, in a publication in 1799, that the quantity to be strewed on an acre, is about *eight bushels*.

The translator of this article, some time since, published an account of one of his own experiments on plaster, made purposely to ascertain, whether there was any foundation for the commonly received *notion* that plaster, or gypsum, would not answer near the sea-coast. He then sowed, or strewed, at the rate of twelve bushels to the acre, on a small spot, and the effect was very great and obvious. Since that time, he has continued for three seasons the use

of plaster on clover, and he can venture to affirm, that its effects are as great as those represented by Monsieur Canolle. He has invariably applied it to dry, gravelly land, which, before, he used plaster, hardly yielded grass enough to pay the expense of cutting, but which now furnishes the best crops, and retains its verdure better than any land he possesses, though he has some rich, low, and moist ground. We now introduce to our readers the experiments of one of our Trustees, who was among the earliest, most patient, and most observing persons in the trial of this manure, in this neighbourhood.

[To the Corresponding Secretary.]

The power of plaster in promoting vegetation, is certainly very extraordinary; but how this subtle principle operates, seems as yet to disappoint the most intelligent and inquisitive. Some who have made very extensive and successful experiments therewith, in the interior, cannot but believe, that its application is beneficial every where; whilst others, who have pursued a like course on moist soils, on hard bound grass fields, and in many situations on the sea-coast, under their impressions of discouragement, seem almost disposed to doubt its utility under any circumstances. I have been induced to think its operation was ineffectual near the sea-coast. Indeed my own experiments, distant about two miles from the bay, led me to this conclusion. But I found, in conversation with some very intelligent farmers upon Long Island sound, that they have experienced great advantages from its application. From this it certainly appears, that its operation depends more on the nature of the soil than from the state of the atmosphere, as constituted by its contiguity to the sea coast. It is to be hoped, that by a continued series of experiments, some light may be shed upon this subject, so

interesting to agriculturalists. It opens so extensive a view to the enrichment and productiveness of our soil, and promises to add so abundantly to the means of support, both for man and beast, that it presents as it were a new era in the annals of agriculture. Not confining itself to a single class of the community, but interesting to the political economist as the increased support, comfort, and happiness of the great family of man.

I shall now proceed to state the result of some experiments, made in several successive years, upon different soils, and in distinct places. The first was about fourteen miles from the sea-coast, upon a field of rye, where the soil was rather light, gravelly, and tolerably well manured the year previous, for a crop of corn. About two bushels to an acre, were spread on a part thereof. Though no measurement of the grain was made, yet the stalk was stronger, more green and flourishing, and the product of grain itself evidently more in quantity.

At the same time an experiment was made upon Indian corn, about one spoonful being thrown upon each hill at the time of weeding. Its beneficial effects were, in this instance, very apparent in the size of the plant, in the ear, and in the green colour thereof.

The advantage was apparent also in several vines and vegetables to which it was applied, and the like difference of colour and thrift of the vegetable was distinctly observable in all cases. The effect of its application, in the laying down of land to a grass crop, was the most remarkable during this year. The crop where it was applied at the rate before mentioned, of two bushels to the acre, was nearly double to that where none was applied, although the land was, under every other circumstance, equal in its advantages. In the application of the plaster to grass sward, which had been long laid down, no beneficial effect was observed. I then transferred my experiments to a situation, about two miles from the sea-coast, upon a moist, rich,

heavy, clayey soil; and they here were, for several years, continued in every mode of application, but I am constrained to say, I never could perceive any benefit in the application of plaster in this situation.

In the spring of 1816, I again commenced the use of plaster in the place first mentioned, and with the advantages formerly experienced. In the application of it to corn, the plant grew much larger, measuring six inches more in height than where none was used. The product of grain was also greater, although no comparative measurement was had. In the application of the plaster to potatoes, where it was used in addition to manure, it added about one tenth to the quantity of the crop. But where manure was used alone, and plaster alone, the increase of quantity by plaster over what was given by manure, was one bushel in sixteen. Here it is to be noted, that where manure was used, there were many small potatoes; but where the plaster alone, they were of more equal size.

It ought here to be recollected, that this was a dry season. In 1817, the experiment was again renewed with the like result upon the same vegetables, which led to a more increased cultivation of that useful vegetable, the potatoe. The past season also might be considered as in a considerable degree a dry one. Having thus submitted the result of the vegetation of several seasons, by the use of plaster, the subject might be dismissed with the hope of exciting the attention of other agriculturalists on the subject; but one or two references to experiments, which have been heretofore made, and to the observations made by Sir Humphrey Davy, in his lectures, which seem coincident, are naturally called forth. An ingenious experimentalist has, with much apparent accuracy, stated in a foreign publication, that by a frequent recurrence to a field of clover, which was laid down with plaster, the dew thereon was very observably retained more than half an hour after it had disappeared from vegetables where none had been

used. It is the observation also of the ingenious chemist above mentioned, that the application of plaster added much apparently to the woody fibre of plants. From all which may it not be deduced, that in perfect coincidence with the foregoing experiments, that one effect at least of the use of plaster is, an attraction of moisture, which induces the perfection of the woody fibre of plants? I have no doubt, that other coincident effects may arise from the use of this stimulating principle.

But as these can only be traced in a long and careful course of experiments and observations, I dismiss the subject with a sincere wish, that others better qualified may pursue it; and if any beneficial observations hereupon be excited from other correspondents, it will afford me much satisfaction.

I am, Sir, respectfully,

J. W.

SOME REMARKS UPON MERINO SHEEP, SHEWING THAT THEY OUGHT NOT TO BE ABANDONED IN DESPAIR, AND INCLUDING SOME JUDICIOUS OBSERVATIONS TRANSLATED FROM A FRENCH WORK ON THE SAME SUBJECT.

[By the Corresponding Secretary.]

In the first place the writer would observe, that he knows it would be vain to attempt to bring merino sheep soon again into favour; all that he aims at is to prevent their entire destruction, or the utter neglect of them, which would eventually come to the same point.

He happens to be one of the very few men of property and leisure who escaped the merino contagion. At the very height of the disease he regretted, though he could not but smile at its violence. The issue was foreseen. Indeed it was impossible it could be otherwise, for if the merino had yielded what the Argonauts went in

search of, a golden fleece, it would have left many of the patients who laboured under that desperate disease exceedingly feeble, and purse-sick.—What animal of that size could possibly repay the prize of one thousand and even three thousand dollars given for a single male, and two hundred dollars for a female, charged moreover, often with extravagant prices paid for farms, the costs of management, and of mismanagement too?—The merino, like every other sheep, requires some skill, some previous acquaintance with its nature and proper treatment, for which neither the comptinghouse nor the workshop are the proper places of education. There is a question which applies to all other sheep as well as the merino, and that is whether we can ever afford in New England to keep such extensive flocks as are kept in England, and some parts of France and Germany? It seems to be the better opinion that we cannot, and that sheep will probably continue to be raised but in small proportions to other stock, or in about the proportions in which they have been hitherto raised. Let this question be settled as it may, it appears to us certain, that the merino sheep is a much more profitable animal than our common coarse woolled sheep, not that it would altogether supply the place of our old flocks, for we take it to be as true here as it is in England, that for many uses the coarse wool is absolutely necessary.

Many questions which were once problematical are now settled in favour of the merino.—It was doubted whether it would stand our climate—It does perfectly—Whether its wool would not degenerate—It rather improves—Whether its meat would be good for the table? It is as fine at least as any mutton we have.

Whether the wool could be exported to England and sell there at a fair price? It has been done, and met such a sale as would yield a much greater profit on merino sheep than on the common sheep.

When therefore we add to this, the great success which the Saxons, whose climate is as severe as ours, have experienced in raising the merino sheep, that the Saxon merino wool is the best in the world, and fetches the highest price, nearly double that of some ordinary merino wool, and treble that of common wool, we do entertain hopes that a disposition to depress them and run them down will no longer be felt, but that they will be suffered gradually to rise to their proper value. With these remarks by way of apology for introducing an unpopular subject, we proceed to the extracts from an essay by M. Morel de Vindé, published in Tessier's Annales d'Agriculture, so late as 1816.

M. Morel, an extensive proprietor it should seem, a man of great intelligence, as our readers will perceive, the owner of an estate at Vindé near Sezanne, in the department of the Marne, within fifty or sixty miles of Paris, thus gives an account of his own experience in merino sheep. His remarks go to a much higher point, to prove not only that merinoes are profitable in themselves, but tend to promote good culture.

"The amelioration and improvement of agriculture, appearing to me to be one of the immediate and necessary effects of the improvement in the breed of sheep, as I shall prove in the following article, and *that* part of this department, of which Sezanne is the centre, being one of the most backward in every thing that may be called good cultivation, I conceived the idea of introducing merinoes into this country, with all the advantages which usually accompany them. I had many obstacles to encounter, which need not be detailed to any who know how difficult it is to eradicate the prejudices of farmers. [*French* farmers are here spoken of; it is hoped and believed that the difficulty is not so great with us.] I had *in vain* solicited my own tenants, and the owners of the flocks held in common, to accept gratuitously, (for nothing) pure rams to mend their breed. They repelled the offer with disdain, and even with dis-

trust. They replied, that this race (the merino) could not live in their country, that they could not *sell the wool*, that they would cost too much to keep, &c. &c. In short, I became satisfied that I must begin by *convincing* them by *selling*, not *giving*, and I proceeded thus:

"I bought of my respectable colleague, M. Tepier, one hundred males of *pure race*. [So he always calls the unmixed merino.] I designed them to make the foundation of my flock at Vindé, and I intended to add to them all the rams I could spare for *Celle-saint-cloud* (one of Mr. Morel's other estates.) I then applied to one of my farmers who had more confidence in me than the others. I did not convert, but I made him yield to my entreaties, and to the pecuniary temptations I offered him.

In September, 1810, I sent him ninety-eight ewes, and fifteen rams of pure race. Every thing is so low in this unhappy country (certainly not above sixty miles from Paris) that he made a good bargain for himself in taking my sheep at six francs (one dollar and twenty cents,) a head per annum. I gave him besides, a franc (twenty cents) as a premium for every pound of wool they should give above six pounds each on an average.* All the produce was mine except the manure and premium.

The arrival of this flock was a great event in this country, and neither my shepherd, my steward, my farmer nor myself, escaped taunts and jests. However my flock went through the year without the loss of a single one. This was the first source of astonishment to my neighbours.

In June, 1811, (the next year) I had them shorn and weighed publickly. There was no want of curiosity, and the visiters were much struck with the weight of my fleeces, which was nine pounds a head. I employed some of my friends to come and buy this wool. I sold this year at forty cents the pound, and this high price touched and affect-

* The flock must have been very fine or there could not be much gained by the farmer as a premium. EDITOR.

ed my numerous visitors. [You see the French farmers consider forty cents a satisfactory price for merino wool. Why should we not be able to raise it as low? Is it our long winters, or inferior culture?] In short I gave out, that offended with the rejection of my former offer, I had forbidden my farmer to sell, give, or lend a single animal.

This prohibition excited their desire, but I secretly ordered the farmer to let out his fifteen rams at the highest price he could obtain, which he might put in his own pocket. Thus adding interest to secure his active co-operation. He used his permission well, and the fifteen rams were soon not sufficient to satisfy all the demands, and he let them at the average price of six dollars each. In consequence, I sent him forty-two more rams in September, and thus continued to increase them every year till they amounted to three hundred and fifty. The benefits were very great for the farmer, but still greater for me; for if in the neighbourhood of Paris, and in countries where forage is dear, the value of the wool is not sufficient to pay the expense incurred by a flock without selling the increase, it is not so in places where forage is cheap: My sheep at Vindé bringing me an average of eight pounds of wool each, which sells at forty sous, or about forty cents the pound, that is about three dollars and twenty cents a head, and only costing me about one dollar and twenty cents for keeping, each male thus produced me an annual profit of two dollars.

Soon the flocks of that part of the country changed entirely, the mixed breed increased every where, and you now see in the flocks of individuals, as well as in the common ones, crosses of the third generation.

But this was not the only object I had in view. I knew that this improvement of the breed would *necessarily* force them to better agriculture.

My farmer perceived *the first*, that he should derive a benefit by employing his fallow grounds in raising fodder for animals that were so productive to him. He asked my

advice. He raised vetches to cut in flower. He sowed clover, tried saintfoin, he succeeded, was soon followed by others, and the aspect of this country rapidly altered. Farmers once enlightened, no longer repel good advice and example, and I have the inexpressible satisfaction to see now on their lands, so ill managed ten years ago, artificial meadows in full prosperity, plaster employed at great cost on the clover lands, and some parts of the waste lands overloaded with plants for forage.

And what produced all these benefits? Simply the introduction of fine woolled sheep, and creating the desire of possessing them. I shall develope this idea in the next chapter.

OF THE NECESSARY EFFECTS OF THE IMPROVEMENT OF THE BREED OF SHEEP ON AGRICULTURE.

People are surprised at the obstinacy of farmers in their ancient habits, and prejudices, but it appears to me quite natural. In the ordinary state of things, when nothing new stimulates the farmer, what motive has he to change his routine or system? No immediate interest excites and draws him, but the dangers of innovation deter him from it. But if he perceives a new considerable and certain profit, rely upon it he will adopt the novel usage which is necessary to attain it. And such is the effect of introducing merinoes or even half bloods in any country or district. Till this happened the farmers only calculated on the *death* of their sheep. It was their *death only* which turned to their profit, of course they took but little pains to make them live.

But here is a breed newly introduced, whose fleeces are more than six times as valuable as those of others, a breed which do not yield a profit except by their good health and preservation, and give a much greater profit by their lives than others by their deaths. It is necessary then to make every exertion to subsist, as well as possible, this new breed.

But these means of subsistence are ruinous as we are obliged to buy them. We must then try to raise them ourselves. Once admit this inference, and we are instantly obliged to commence *artificial meadows*, (all grass sown for mowing land is here intended.) We yield to the temptation more readily, because obtaining an extra quantity of manure by a well fed and permanent flock, one would have reason to dread the exhaustion of the land; and one would try to prevent this effect by a change and routine of crops; and as this series of crops and effects really includes the best principles of agriculture, it will of course follow that the farmer will really have been forced to adopt it without design. He will grow more industrious; better informed, more disposed to imitate, and in spite of his prejudices, the introduction of fine woolled sheep will make him a good farmer. If he refuses to adopt this improved agriculture, he must give up his sheep, and that he will never do when he has once felt the superiority in weight and price of these improved animals. I am, therefore, bold to assert, that the late improvements in our agriculture, are owing in a great measure to the introduction of fine woolled sheep into France. That if they should now be abandoned, agriculture would again become retrograde, and as much so as it has of late improved, and of course that it is for the interest both of the government and people, to encourage as much as possible the improvement of the breed of sheep."

In letters addressed to the French minister of the interior, M. Morel de Vindé, (who it would seem was not an emigrant, for he carried on his great experiments during Bonaparte's reign, from 1808 to 1815,) gives credit to Louis XVI, for introducing, and causing to be propagated, the merino sheep in France; and says if his views had been followed up, France would now have had fine wool enough for her own consumption. He says that the faults committed in the management of them during the revolution, and especially since 1806, (under Bonaparte) had

caused the amelioration to stop, and had well nigh produced a total loss of the improved breed. He then adds, that the government may judge of what importance this article is to France, since she purchases from foreign countries twenty thousand bales of fine wool annually, for which she pays the sum of from thirty to thirty-five millions (francs) equal to about seven millions of dollars, which he says in a very few years she might produce herself. He proceeds to detail the political and commercial advantages which would result to France from encouraging the production of this article of primary importance. We do not copy this part of his essay, because it must be familiar to every farmer, that the first duty of a government, and the highest interest of a nation, coincide in encouraging the production at home of these raw materials which are of the first necessity in manufactures, the most important, and of most extensive use. We shall conclude this extract by giving M. Morel Vindé's own success or ill success (whichever we may call it) in raising merino sheep. In some views he was unlucky, because his loss by diseases far exceeded what well managed flocks *here* have suffered, and his prices of sale for wool were low. But his sheep he sold well.

"I have thought," he remarks, "that after eleven years experience, I should render a service to those who would raise merino sheep, by communicating to them the produce of my flock and the losses I have experienced. It may serve at least as a means of comparison with the efforts of others. I began my establishment in June, 1805, with two rams and ninety-two ewes. In eleven lambings I had born 1087 males; 1101 females; total, 2188—Out of which there have gone from my flock—by decease, 145 males, 209 females; total, 354—By sale, 534—By sending to my other farm at Vindé, 350—Total of those gone out, 1238. Remains of my flock, 950, to wit, 300 males, 650 females.

Thus, (besides what he sent to his other farm at Vindé) he says, "I possess a flock of 950 sheep, all young, all well

chosen, and the most perfect possible. I have sold 534, (the ewes chiefly mixed breed) for the price of 51,637 francs, or about 10,000 dollars, say 20 dollars each. This price is low, but the circumstances of the few last years have been so unfavourable that I have never sold but after selecting the best for my own flock. I have shorn 4279 fleeces. These weighed 33,381 pounds, and were sold for 68,326 francs, or about 13,600 dollars, and what is more, I have been obliged to make my lands produce more forage, in order to nourish this great number of sheep, without spending money to purchase food. Besides the advantages I have gained in times so bad, I have obtained a more important result by introducing with great and rapid success, the improvement of flocks and of agriculture in one of the parts of France the most backward in these respects."

Such are Mons. Morel's remarks, which we must all acknowledge are intelligent and sprightly, and from the very respectable source from which we extract them, we have as much reason to conclude that he is as worthy of credit as Arthur Young, or Anderson, or any other writer.

It will be seen that in eleven years his flock of 100 sheep produced him

In wool, ...	13,600
In sales of increase, . . .	10,300
Suppose his sheep he kept at Vindé to be equal in value to what he did sell, i. e. only 20 dollars each . .	7,000
His own flock at St. Cloud, 950, at same price,	19,000
	$ 49,900
If his wool had sold at the average price (in *this* country) of the last two years of peace, say one dollar, it would have amounted to . . .	20,400
	$ 70,300

One cannot perceive any error in this calculation, and yet it may exist.

[Extract from Tessier.]

A FRENCH writer, whose essay is contained in the same volume of Mons. Tessier's annals, with the one from which we have extracted the remarks on the merino, has some curious and to us new observations, as to the treatment of canker in apple trees, and gum in peach trees.

He says he had heard "that a cultivator, in order to prevent the *canker* in apple trees when he grafted them, inserted and *closed up* in the slit or cleft made in grafting, a *small blade of iron.* I have repeated this experiment four years ago, and it has succeeded hitherto," but "I have a remedy which I have never known to fail both for gum and canker. It is easy to see when the tree is threatened with the malady, the bark becomes slippery, smooth, and tender. The tree begins to flatten on the side next to the sun, or perhaps the opposite side. You must then hasten to make *setons, or issues,* by cutting slits in the bark. Place them as you would issues in the body, in a proper relative situation to the malady, say on the opposite side, but if that does not succeed, proceed with your incisions. You may continue them without danger, quite to the root of the tree. It ought to be done three times a year, in April, July and August. For the canker, you must, besides, cut off the diseased bark, and cover the wound with cow dung plaster." He seems to think the canker is owing to the superabundance of sap flowing around the graft, which by the incisions finds an innocent and safe vent.—We do not vouch for its efficacy, but it is easily tried, and can do no harm we are persuaded.

ON THE INJURIOUS INFLUENCE OF THE BARBERRY BUSH UPON WHEAT AND THE OTHER ENGLISH GRAINS.

THIS opinion, often deemed a prejudice, and by others considered as an unquestionable fact, has lately received

the most full and scientific investigation in France. The result of these inquiries, comprised in no less than eighty-four pages of Tessier's annals of agriculture, published so late as 1816, seems to settle the question as to the injurious effect of this plant, and that it is pretty uniformly in France, England, Switzerland and Germany, considered, and we may almost say proved, to be one of the causes of blight. We ourselves were perfectly incredulous on this subject, but we are compelled to yield to the weight of proofs.

It is no longer attributed to the influence or operation of the farina of the flower of the barberry, which is over and disseminated several weeks before the several species of grain are in blossom, but it seems to be attributed to a parasitic plant very abundant on the barberry, and which is considered to be the same which causes the rust upon the stalk of the wheat. It would be beyond the scope of this Journal to give all the evidence on this subject, but we refer our readers to the work above mentioned. We can assure them, that though wholly incredulous, we have been perfectly satisfied with the evidence, patiently, coolly, and fairly sought, and furnished in that work. France, being of all nations, perhaps the most interested in this inquiry, much respect is due to the deliberate opinions thus formed after candid research.

ON THE BRIGHTON CATTLE SHOW.

[By the Corresponding Secretary.]

THIS Institution owes its origin to the successful example set by the most distinguished cultivators in Great Britain. It is a fact well known, that the effect of these public exhibitions of domestic animals in Europe has been to enhance the value of the best animals, and thus to give to those who select and raise them, the reward which is naturally due to them. If this had been the only consequence,

it would have been sufficient to induce an imitation of the example. But much more important effects necessarily follow. Others, who have not been so successful or attentive, are induced to emulate, and to attempt to excel the successful candidates, and thus the whole breed of any particular species is rapidly improved.

A country might possess in some particular county or district, a race of animals far superior in every respect to the ordinary ones of the same species, for a great length of time, without its being known, or any attempt to propagate and increase the breed. Thus, though the Byfield, and Bedford race of hogs has been long in the country, yet their extension and propagation would be much more gradual, if only communicated from neighbour to neighbour, than when they are made the subjects of public exhibition. The same remark applies as forcibly to individual and rare examples of singularly good properties in cows or bulls, which might remain confined to their owners for many years, their calves committed to the butcher precisely because they were fatter than any others, and thus the increase of the race be prevented. By tempting the owners of these extraordinary animals to present them for premiums, their merits are made known, they are either purchased at great prices, or the owners are induced to preserve their progeny, and thus a rapid improvement is effected in our domestic animals.

Some remarks have been occasionally made, indicating dissatisfaction, and expressing a sort of sneer at the offer of premiums for imported animals. This subject is not properly understood.

The trustees have no doubt that there exist scattered over our country, animals of every sort adapted for domestic uses, equal to almost any which can be found in any other country; though it would be extraordinary if nations which have for fifty or a hundred years, at great expense, been constantly selecting their best animals for *breeding*, should not have *accidentally* obtained a breed

better than could be found in a country where there has been no system, no effort, no public encouragement, but where they have been subjected to indiscriminate slaughter.

When individual bulls of a particular breed are sold at 300 or 500 guineas, (1500 to 2500 dollars,) and this too in a country where an ordinary bull is as cheap as in ours, it would be indeed surprising if this encouragement should not have produced animals superior to any which would be obtained without such rewards. We could only account for its failing to do so by supposing such a nation in a state of delusion, and that they threw away their money without any consideration. Some misapprehension has also existed as to the principles on which the trustees have awarded their premiums. It has been supposed that in offering as well as awarding their premiums, they had reference *only to size.* It is not extraordinary that such an inference should have been drawn from the terms in which the premium was offered—but no such idea was at any time entertained by the trustees. They feel and recognize that Bakewell's principle, that those are the most profitable animals which give the greatest quantity of flesh with the least bone and offal, is incontrovertible. The first premiums they offered were founded on this sentiment, and of course they required a minimum of size of 1300 pounds only, believing this was one which a well formed and profitable animal could easily reach, and yet be perfectly within Mr. Bakewell's rule. They accordingly gave the premium the first year to two oxen weighing rather less than 1300 pounds.

But the spectators were dissatisfied. They went away disappointed, and said that hundreds of as fine oxen might be found in the State, and therefore it was absurd and of no use to give them a premium. Now though it is freely admitted that it is the duty of such a society to endeavour to correct erroneous opinions, and to introduce those which are more sound, yet in the outset of such an institution, when it was necessary to force it into public favour, and

attract public attention, it was thought advisable to allure to the show the owners of extraordinary animals, which had cost the raisers of them much pains, and which would better satisfy public expectation, however erroneous the opinion of the value of such cattle might be. Yet in awarding this premium on the great Springfield oxen, the trustees did not depart from the spirit of Bakewell's principle, as they awarded the first premium to the smaller ox of the two, on the ground that he had the most flesh to the same weight of bone. The trustees wish therefore that it should be distinctly understood, that in judging of animals which are offered as fat ones, they have, and shall always prefer those which with the least quantity of food, and the smallest weight of offal, shall offer the greatest quantity of meat.

This will apply to oxen, sheep and swine. But there must be some exceptions in favour of those persons who with uncommon care shall have brought up animals of very extraordinary size, without very heavy expense, since they believe in the outset of their experiment, such an attention on their part will have a beneficial effect on the general care and attention to the race of animals, always however, avowing their preference for those which show a remarkable tendency to fatten, whatever may be their size.

OF THE DIFFERENT USES TO WHICH THE WOODS OF THE AMERICAN FORESTS ARE APPLIED IN THE VARIOUS PARTS OF THE UNITED STATES. FROM THE FRENCH OF MONS. MICHAUX.

[By the Corresponding Secretary.]

It may appear a little singular, and wound the pride of some of our citizens, who cultivate too strong a prejudice in favour of our own country, that we should resort to a foreigner to afford us intelligence as to the value and uses of *our own* woods.

Yet it is nevertheless true, that there probably does not exist a man in the United States, who could furnish such a complete body of information on this subject as M. Michaux. Nor is it any reproach to us, for what man among us has been employed systematically for four or five years in traversing the United States, as Mons. Michaux did, with the exclusive view of ascertaining the number, character, and uses of our forest trees?

It may also be questioned whether this information is important, and whether it merits a place in an Agricultural Journal? We have always wished that our publication should be as well devoted to more extended views of the agricultural interests of the nation, as to those more immediately practical.

There is no publication in our country in which this sort of information can find so natural and proper a place. In botanical works, room cannot be found for so many practical remarks, and there is not enough of science in this subject, to entitle it to a place in our philosophical publications.

But what is its use? Surely it is of some advantage, to know the various employments, and the degree of value of all the trees in the United States. It is to be hoped that sooner or later we shall become a planting nation; that we shall attempt to repair the waste and destruction which a thoughtless profusion and carelessness have occasioned in our original forests. It may then be important to know whether some of the trees of the Middle and even Southern States may not be introduced into New England, and whether we cannot in exchange furnish them with some of ours.

For example, the Tulip tree, (Liriodendron Tulipifera) is not found growing wild north of Connecticut, and yet it flourishes well with us, and it will be seen that it is successfully applied to some uses for which our own trees could not be used to equal advantage. With this brief apology for occupying so much of our Journal on the sub-

ject of our forest trees, we shall proceed with M. Michaux; remarking that the part of the information which applies to our own Massachusetts' trees may be thought too familiar, but may be useful and agreeable in other parts of the Union.

Mons. Michaux remarks, that his object is simply to point out the trees which are employed in the mechanic arts in the United States, and he expresses himself with great modesty as to the accuracy of his information. He begins with naval architecture.

In Nova Scotia, New Brunswick and Maine.

The shipwrights employ for the keel, in preference, the sugar maple or white elm. For the bottom of the ship, they have no, or very little, white oak. The small quantity they possess of the gray oak, (quercus ambigua) and of the red oak, (quercus rubra) induces them to reserve them for the upper works. They supply the want of oak for the parts which are under water, by woods, which, though far inferior to oak, yet answer better for this part of the ship than they would do in those exposed to alternate dryness and wetness. Thus, for the bottom they employ the yellow birch, (betula lutea) the red beech, (fagus rubra) the sugar maple, and the white ash, (fraxinus Americana) the two first are most esteemed; the last the least. For the the upper works they employ the white oak, when to be procured; and for want of it the gray and red oak. The planks are of white oak. For the wales the red or Norway pine, or sometimes the Southern or long leaved pine. For knees, white oak, gray oak, red oak, or black spruce, (abies nigra) frequently employed because easily procured. The decks are of white pine, or red or Norway pine. The lower masts are of white pine, and the upper of black spruce.

In Boston.

They use for the keel pretty constantly the white oak. For the bottom and upper works, pretty universally, white

oak, but sometimes employ for the former the red oak, gray oak, and scarlet oak, all under the general name of red oak. For the knees they also use the white oak, but in the repair of old vessels, they employ sometimes the black spruce. For planks they use white oak, and for wales the southern pine. The decks are generally of white pine, but they prefer the Norway pine. They procure it from the Middlesex canal. The builders call it yellow pine, but that pine does not grow so far to the north. Some very few vessels are built of live oak and cedar.

In New York.

For the keel they always use the white oak. Formerly they sometimes employed the hickory, (juglans squamosa). For the bottom they use the white oak, and occasionally the rocky oak, (quercus prinus monticola). For the upper works, live oak and cedar, placed alternately. They are imported from Georgia and East Florida. For plank on the sides, they use white oak, and sometimes the rocky oak; and the same for knees. For the decks they use the yellow pine, (not the Norway) which they import from the eastern shore of Maryland. The masts are of white pine, the upper ones of black spruce.

In Philadelphia.

For the keel they use white oak, and rarely, walnut or hickory. The bottom is built of white oak, mixed with a small proportion of black walnut, of locust, and of red mulberry. For the upper works in well built vessels, they employ the live oak and cedar. They import also the red bay, (laurus caroliniensis) which is employed in small proportions, instead of cedar, which is becoming scarce. They also use in the upper works the locust, red mulberry, and black walnut. These woods are stronger than the red cedar, and lighter than live oak, and if clear of sap and well seasoned, will last almost as long as live oak, and

longer than the white oak. They come from the river Susquehanna. Large red mulberry trees also grow on the borders of the Delaware. In well built vessels they no longer employ white oak for the upper works. The plank are always of white oak. Treenails of locust, knees generally of white oak, and as they become scarce, of the rocky oak, there called the chesnut oak. The black walnut is also esteemed for knees, but proper pieces are difficult to be procured. The decks are of yellow pine, or long leaved pine, imported from Carolina or Georgia. The large masts of white pine; the upper ones of yellow pine or black spruce.

In Baltimore and Alexandria.

They use chiefly the same woods as in Philadelphia. Their ships are very well built, but they make more use of the locust and red cedar.

Charleston, (S. C.) and Savannah.

The keel is always made of the pinus australis, or long leaved pine, and is as good as white oak. The bottom is made of live oak and long leaved pine, and sometimes they mix with them the post oak, (quercus obtusiloba) and (quercus falcata,) Spanish oak. The upper works of live oak and cedar. The decks are always of the long leaved pine, which is the *best pine* that grows in North America. The knees are of live oak generally. The plank on the sides, of the long leaved pine, but they say they do not make as good joints as those of oak. Treenails of locust, or heart of pine. The masts are of the long leaved pine, which are stronger than white pine. Ships built of these materials, well seasoned, are as strong as those of New York and Philadelphia.

Louisville on the Ohio.

For the keel they use the white oak. For upper works, the white oak mixed with the black walnut. In the bot-

tom they employ white oak, with a great proportion of locust, red mulberry and black walnut. They employ also the wild cherry, and red elm, but they ought not to be used but when they are well seasoned. The knees they make of locust, red mulberry, black walnut, and white oak. The planks are always of white oak. The decks of yellow pine, (not the Norway). The treenails of locust. Masts of white pine, and the yards of black spruce, which they procure from the Alleghany river. Ships' pumps are made in New York, Philadelphia, and Baltimore, of the (pinus rigida,) sap pine. In the maritime Southern States, of the pinus tœda, or loblolly pine. Blocks and oars in the Northern States, are made of white ash. In New York and Philadelphia, partly of the white ash, and partly of the red ash. Most persons know that blocks made of the red elm would be preferable, but it does not grow in sufficient quantities to the east of the Alleghany mountains, to be employed for this purpose. Figures and ships' heads are always made of white pine, as being more easily wrought.

FOR BUILDINGS.

In the great cities they are generally of brick, but in the villages and country, nineteen twentieths are built of wood.

In New Hampshire, Connecticut, Massachusetts and Vermont.

In the great towns the white pine is preferred, but as it grows scarce by consumption at home, and exportation, they use for some parts the black spruce and the hemlock. The large timbers of the frame are universally of white pine, but the joist are frequently of spruce. The first boarding is of hemlock spruce. [A mistake.] The second is composed of what they call *clapboards*, or as M. Michaux spells it, calp boards. The planks and floors are generally of white pine, but in the country some prefer the black spruce, because it is harder, and less liable to be in-

jured by the furniture and wear. The shingles are made of white pine. Those made of the (thuya occidentalis,) white cedar, would be preferable, but could not be afforded as cheap. Laths are always made of hemlock. Doors and window frames are always of white pine.

In New York.

In wooden houses, the frames are altogether of white pine: as are also the boards of the outside and inside. The floors are of white pine, when they are intended for carpets, and in others of the yellow pine, because they are harder. Roofs of shingles of white cedar. In brick houses the timber is often of white oak, but all the inside work of white pine.

In Pennsylvania and Delaware.

The white pine is employed in the wooden houses. And the shingles are of white cedar, or yellow pine. In brick houses, the lower timbers are of white oak, or black oak; and the upper ones of sweet gum, (liquid ambar styraciflua). For joist they use the white oak, black oak, and tulip tree, preferable for its lightness as well as solidity. Floors generally of yellow pine. Roofs of white cedar or cypress. Windows and doors of white pine. The window stools of yellow pine. The cornices and inside work of white pine.

In some of the back parts of Pennsylvania, the frames of houses are of white oak. The floors of very narrow strips of white oak, and the shingles of black oak. The outside boards, doors, window frames of the tulip tree.

In Pittsburgh, and at Wheeling on the Ohio, the frames of houses are of white oak. The outside boards and inside work of white pine, and the roof and covering of white pine.

Many houses in this part of Pennsylvania are built entirely of white oak, and shingled with black oak.

The tulip tree is admitted to be inferior to the pine, but more durable than the oak, and more easily wrought.

Chesnut shingles would be preferable, but are not easily obtained in this part of the country.

In Maryland and Virginia.

The houses of wood are generally built of yellow pine; except the inside work, which is of white pine. The shingles are of the (cupressus thuyoides,) here called the juniper, except some that are made of the (cupressus disticha,) cypress.

N. and S. Carolina and Georgia. In the lower parts.

Three quarters of the houses of Charleston, Wilmington and Savannah are built of wood. The frames are of the long leaved pine, (australis). The boards outside are of white pine. Inside of white pine and cypress; so also for the doors, windows, &c. Cypress is used also for shingles. Formerly they made more use of cypress than at present; and in the interior they use the cypress chiefly, which is more durable than the long leaved pine.

In the Upper Carolinas they build of the yellow pine, covered with shingles of the same, or of the tulip tree.

In Kentucky.

At Lexington and its vicinity, where the greater part of the houses are of wood, the frame is of blue ash, (fraxinus quadrangulata) or white oak, lower floors of blue ash, or white oak, and upper of the tulip tree. Outside boards, of blue ash and tulip tree; but these last are apt to shrink and swell. Inside work of the tulip tree, wild cherry and black walnut. On the roofs they lay boards of the (celtis crassifolia,) upon which they place shingles of the tulip tree. To prevent these last from shrinking they make them very short, and they last, it is said, forty years; and they have the advantage of never splitting, either by frost or heat.

M. Michaux was not in Lower Louisiana, but he learned that their wooden houses were constructed of the cypress,

(cupressus disticha) an excellent wood, very durable, and superior to all the species of pine.

Lest we should fatigue the patience of our readers, or be thought to devote too much of our Journal to a subject which though interesting to agriculture, is not so proximately connected with practical husbandry, we shall defer the rest of this essay of M. Michaux till another opportunity.

EXTRACTS FROM THE MUSEUM RUSTICUM, AN ENGLISH WORK; NOT AMONG THE MOST MODERN, BUT CONTAINING MUCH VALUABLE MATTER.

THERE are but few remarks applicable to English husbandry, that will not apply here. When they are not applicable, the good sense of readers will distinguish them.

"The bad success of great numbers," says a writer in the above named work, "is owing to their not having a sufficient sum of money to begin with, which involves them in difficulties, and reduces their profit on every article of produce. The farm is *understocked*, (and he might add if he lived in Massachusetts, often stocked with poor animals) for want of money to buy better. They sell at a constant disadvantage, and in a few years, unless some lucky hit sets them up, they grow poor, in spite of industry, judgment, and application.

"The want of judgment too in apportioning and proportioning the quantity of stock, and of each kind, to the quantity and quality of the farm, is attended with great loss.

"There are inconveniences and losses, arising either from overstocking or understocking a farm; and the farmer ought always to remember, that *three beasts* of any kind, well fed, pay better than four without their bellies full.

"Two thirds of the land of a farm in a rich country should be grass, and a little one should *all be so*. The

vast expenses of the plough, without doubt, make many farmers poor, who, if their farms were grass would not run half the hazard, and enjoy a much better income."

Most of the above remarks apply well to our country. Speaking of *gentlemen farmers*, a description of persons very numerous in England, and growing more so here, the author says,

"There are many evident reasons why farming should prove unprofitable to gentlemen who undertake to cultivate their own farms, whether for amusement or convenience, or generally speaking, *even for profit.*

"In great farms in Norfolk, and where gentlemen will be at the expense of manuring with marle, there is no fear but they will have a profit; but in common farms, in rich countries, no profit can arise to any gentleman that does not give the business constant attention, and *descend to minutiæ.* I am persuaded they lose considerably by keeping land in their hands. The plea of growing wheat, oats, &c. enough for *family use*, is a mistaken one; they had better by far buy every article, than have any thing to do with the plough. When I hear that farming answers to gentlemen who do not give the *farmer's attention* to the business, I *never believed it*, or at least am persuaded, regular accounts are not kept." He then goes on to assign *some of the reasons* why gentlemen farmers do not succeed in making it profitable. Among the rest, "Cattle cannot thrive but under the master's eye—every variation of the season is to be watched—the lucky instant to be seized for ploughing, harrowing, sowing, reaping, &c. Constant attention is required," which he supposes no gentleman farmer can or will do; and if he employs others, they run away with more than all the profit.

These remarks are most of them applicable in our country, though our gentlemen farmers have much more industry; there are many of them who give great and assiduous personal attention; yet the hired people too frequently get

the honey, and leave the expressed comb only to their employers.—But this English writer does not think that *gentlemen farmers* are without *their use.* He says,

"The public good *calls loudly* to all gentlemen to keep some land in their own hands, that experiments may be made, and modes of agriculture pursued, different from the practice of their neighbourhood, for the farmers at least, to see that their own customs are not the only good ones, and that there are improvements to be made even on *their* practices. All the inventions and new improvements in agriculture, come from gentlemen farmers. [He is speaking of England.] I do not wonder at this—it is natural enough, and is a sufficient reason why gentlemen should carry on farms, even if it is not profitable. The extensive use of manures, and introducing a garden culture into field husbandry, were the effects among an hundred others of gentlemen's farming. But if public good had nothing to do with it, still the amusement would be a sufficient apology for it. Such farmers soon make a garden of their estates, and improve the value of them."

The above remarks are in some degree applicable to our country, and in some respects more forcibly. Our gentlemen farmers have been usually *men of business*, not born to fortune as the gentlemen in England. They have wrought their own way to estates; are accustomed to attention; and to the direction of labourers. They know the value of money, and its most judicious application.

The equality of condition with us, renders the example of gentlemen farmers more useful. The small farmer and the pleasure farmer meet on equal terms, and frequently, and of course there is more interchange of thought and practices, more consultation and discussion than there can be in England, where it is admitted by the above cited author to be so useful. We will take horticulture as an example; the most delightful, and near great towns and villages not the least profitable branch of agriculture.

How long would it have been, before the common farmer would have introduced the fine pears which the intelligent and opulent Hugonots, the French refugees, introduced here? How long before our common farmers would have opened to themselves the rich treasures of the New York and New Jersey nurseries? There are very many species of fruits, including all sorts, which have been introduced by the zeal, intelligence and liberality of gentlemen farmers. The same applies to many culinary vegetables, and in some degree even to the more important plants destined for general subsistence. These reflections were excited by the extracts from the Museum Rusticum; and are designed to show that the richer cultivators who pursue agriculture for amusement are not to be considered as useless. They may be *drones*, but it should be remembered, that the swarms cannot be perpetuated, without that part of the common family.

The following prices of labour and farming implements in England, at the time when the Museum Rusticum was written, may serve to amuse.

A waggon complete, seventy-five dollars.

A cart complete, forty dollars.

A two wheeled plough, thirteen dollars.

A swing plough, four dollars and fifty cents.

First ploughing, an acre, one dollar and fifty cents.

Second do. one dollar and ten cents.

Harrowing an acre, twelve cents.

Price of horses from twenty-two to seventy dollars. Farm horses are meant.

Price of cows, from thirteen dollars to thirty-five.

Sheep, from two dollars and fifty cents to four dols. fifty.

Hogs, from one dollar and ten cents to nine dollars.

Wheat, from one dollar and thirty-three cents, to one dollar and sixty cents a bushel.

Barley, sixty-six cents a bushel.

Oats, forty-four cents a bushel.

Red clover seed, eight cents a pound.

Wheat straw, two dollars and thirty-three cents a load.

Clover hay, fifty-five cents a hundred.

Lime, eleven cents a bushel, or eighty-eight cents a hogshead.

Bricks, four dollars a thousand.

A carpenter, thirty-six cents a day.

A bricklayer, forty-two cents a day.

Making, plashing and laying live hedges for fences, ten cents a rod.—No fence could be reasonably expected to be made cheaper, and it may partly account for the great prevalence of this species of fence in that country; or at least it shows to what perfection the art of making them had attained.

Brighton, July 24, 1818.

[To the Corresponding Secretary of the Massachusetts Agricultural Society.]

DEAR SIR,

You have for several years past considered the cultivation of wheat so important to New England, and particularly to this section of the country, and have urged so strongly trying the experiment, that I think the enclosed memorandum must afford you much pleasure; it is from Col. Newhall of Newtown, a parish in Newbury, county of Essex, and gives the number of acres sown by his neighbours with wheat, the quantity of seed sown, and the produce of each lot for 1817. They have been in the practice of raising that grain for fifteen or twenty years past, and generally with success. I was induced to make the inquiry from seeing their grain, as I passed through the parish, and when most of it was fit to reap, appear much better than any I had seen in this neighbourhood; the straw was bright, the heads long and heavy; and in two or three instances the grain was reaped, and the kernels appeared better than any

raised in this town in 1815, which was considered a favourable season, and the grain fuller and heavier than it has been since. I observed that they have two kinds of Spring wheat, the white and the red; the white is considered the best grain, a larger kernel, and yielding a larger crop. The red is earlier, and less affected by blasts; you see a marked difference in the grain as you ride by it, and if I recollect, more of the patches near the road as I passed were of the red than the white. They all agreed as to the importance of sowing early; their soil is excellent, and their farms generally in fine swells, which perhaps gives them an opportunity of sowing earlier than those who have level or low ground. I have had a few bushels of my wheat of this season threshed out, and some of it ground this day; the flower is white and sweet, the kernel but little shrivelled; it was sown in March, and two parcels sown in April, as early as I could get it in the ground, is much inferior to it, many of the kernels shrunk, and the straw rusty; I impute it to late sowing; and had it been as early as that which I reaped the first of this week, and sown in March, believe it would have succeeded as well. I did not learn in what manner they prepared their wheat in Newtown for sowing, although I requested the inquiry made, but from the Agricultural Society lately established in Essex, we have a fair right to calculate on all the information on the subject that can in any way benefit the community. I have also enclosed a memorandum of some very heavy crops of wheat raised last year in Boscawen, State of New Hampshire.

And am, with respect and great regard,

Your very humble servant,

GORHAM PARSONS.

Our number having reached its usual size, we are constrained to give only an abstract of the information furnished in the above letter. It appears that in the single district of Newbury-Newtown, there were raised in 1817, by thirty-two persons, on 58 acres of land, 1325 bushels of wheat,

making an average of twenty-two bushels to the acre, an average greater, we believe, than that of the most favourable wheat countries. One person, Mr. Moses Emery, raised thirty-three bushels and an half to the acre; and another, Joseph Newhall, Esq. raised eighty-one bushels on two acres and an half.

In Boscawen, New-Hampshire, five persons, the same year, raised on eleven acres, 352 bushels; precisely thirty-two bushels to the acre.

The present year has been unfavourable to English grain, but not more so than that of 1816 was to Indian corn. We hope and trust the culture of wheat will not be abandoned. Early sowing, and thorough ploughing, will, we hope, render it as secure as any crop, except potatoes.

Quincy, 25th July, 1818.

[To the Corresponding Secretary.]

SIR,

As it is a subject of some interest to those who may engage in raising thorns for live hedges, to know how to make the seed germinate the first year, I take the liberty to inclose a letter on that topic. It was written to me in 1811, by Thomas Main, a scientific and very successful nurseryman, in the neighbourhood of Georgetown. He considered the process as an important discovery. Mr. Main is now dead; if there be any thing new, he ought to have the credit of it. I therefore send you the entire letter, and submit it to the judgment of the Trustees, whether it be not important enough to be inserted in their Journal.

I have never had occasion to make any use of the process, but from its simplicity, from the great success Mr. Main had in this branch of his business, and his confidence in its efficacy, I have no doubt it will be found all that he states it to be. Very respectfully, I am, &c.

JOSIAH QUINCY.

PROCESS FOR GERMINATING THE SEEDS OF THE AMERICAN HEDGETHORN AND PYRACANTHA.

The berries of either of the above plants, at any time after they are fully ripe, are to be gathered, and the stones extricated from the pulp by any convenient mechanical means. I commonly put the berries into a trough, and crush them with a wooden pestle, turning over the mass repeatedly, and continuing the operation until the end is completed, so as not to break the *stones;* which are then to be washed clean from the mass, and deposited in a box, barrel, or any convenient vessel, and being covered with damp leaves, or green moss, the vessel is to be placed, out of doors, in the coolest situation that can be obtained, to *retard* the seed from sprouting until the risk of frosty weather is as far over, as conveniently can be obtained. As soon as vegetation commences, the seed are to be inspected every two, or three, or four days, according to the temperature of the atmosphere. When, on being handled, the stones feel slimy, they are then about to open, and must be strictly watched if the weather is warm; for as soon as the shells begin to open, and the little rootlet of *some of them* appears protruded, it is then the exact time to sow them. The whole process may be summed up in one sentence, viz. clean the stones from the pulp, and keep them damp (or frozen) during the winter.

The simplicity and complete efficacy of this process is what has puzzled every person to find it out; for so far as I know, no other person has discovered it by their own experiment.

The seeds of the pyracantha, being extremely small, are to be closely examined and strictly watched as the spring advances, so as to have them sowed at the critical juncture, (before the root is too far protruded) and covered after they are sown, with less than half an inch of very fine mould, sifted or scattered equally over them.

Although it is not essentially necessary to wait until the lobes of the stones begin to open, nevertheless the seed always come up the freest and quickest, when they are sown just at that period; and I have uniformly had the best success, when the weather and condition of the soil gave me an opportunity to sow them then.

Any further information, or explanation, which you may require concerning this article, will be most promptly and cheerfully communicated.

T. MAIN.

Main's Nursery, District of Columbia, Feb. 28th, 1811.

Note. I generally mix the seed plentifully with plaster of Paris, at the time of planting, in order to separate them the better, as they grow better when scattered. About an inch apart, seed from seed, is the best method; a little wider for the pyracantha. T. M.

AGRICULTURAL INTELLIGENCE.

THE Massachusetts Agricultural Society caused to be imported at their own expense the last spring, in addition to the implements mentioned in the last Journal, the Northumberland double-mould-board-plough, considered among the best yet invented in England. Its mould boards are of cast iron, and so contrived, that they may be expanded more or less at the pleasure of the person who uses it, and according to the nature of the soil and the distances which it is proposed to place the rows of plants. It is chiefly intended for ridge work, where carrots, beets, the mangel wurzel, or root of scarcity, or white beet (for it is known by all these names) or the ruta baga, or Swedish turnip, are sown. It would also very well answer to pass between cabbages or potatoes, planted or sowed in continuous rows. This

instrument is now used by the Hon. Mr. Quincy, and is much approved by him.

The Society have also introduced the couch-grass scarificator, an instrument in great and very popular use in England for cleaning lands of couch or twitch grass, and would be also applicable for the purpose of cleaning lands of the Canada thistle, nettle, or any other noxious plants whose roots extend into, and cover the soil. It is also a very useful harrow. It is easily managed by a single horse, and will do as much work in one day as could be done in three, with the same number of hands employed with instruments heretofore in use. This has been tried, and is in the possession of John Prince, Esq. of Jamaica Plains, Roxbury.

They have also imported a mill for grinding small grain, but it does not, at present, appear to promise advantages equal to their expectations. Also a hand-hoe, to be drawn by men, and to weed where it would be dangerous to use a horse. Likewise, a machine for sowing turnip seed, very simple, light, and effectual.

The great object of the Society is, to bring into the country, specimens of improved machines, from which it is hoped our ingenious artists will be enabled to derive hints, and to furnish others better adapted to our necessities and soil, and mode of cultivation, and at prices suited to the means of our farmers.

The Hon. Mr. Thorndike has placed at the disposition of the Society, the bull and one of the cows imported by him the last season from the Low Countries. This breed has been long celebrated for its excellent qualities for the dairy, in which, if in any thing, our stock of horned cattle is deficient. In reference to this quality, this bull has received the name of *Fill-pail*. He has stood this season at Brighton, where he has been very considerably used, but

not so much as we hope he will be in another year. He is one of the finest animals of his age, that has been seen here; of very compact form, and very vigorous. We shall be better able to decide on his merits, when we see his progeny; but it is hoped the more opulent gentlemen and farmers, who have excellent cows, will try him for the the sake of advancing the interests of agriculture, although it may be of no personal advantage to themselves.

Mr. Charles Thorndike, son of the Hon. Mr. Thorndike, has also ordered a bull and two cows from Portugal, and has imported a pair of fine asses, one of each sex, from St. Michaels. Such examples deserve the approbation of the public. It is only by trials and experiments, that any improvement in the races of animals has been made. If we were to see the horse on which Alfred the Great rode, after his restoration to the throne, we should hardly recognize the sire of the present high mettled racer, hunter, and coach horse of modern Britain. We must look to Africa and the shores of Barbary, for the stock which amended their race of horses.

The present season has been, in general, propitious. An unusually great, but extremely needed quantity of rain, in the early part of the season, filled all the rivulets and springs, raised the lakes and ponds, and it is hoped gave a supply for the lower springs, which will enable us to sustain one or two seasons of deficiency. These rains were followed by a high degree, and continuation of heat, (we do not speak with the accuracy of men of science, but as farmers) of which we have no recollection for twenty-five years.

The crop of English hay has been, within twenty miles of Boston at least, abundant; more than an average crop, as it is said, thirty per cent. The price of new English hay, at twenty miles distance from Boston, is at presen

(July 25th) fifty-five cents a hundred. The meadow hay will be considerably deficient.

English grain generally, thereby intending wheat and rye, barley and oats, do not promise so well as in cold seasons. Some exceptions, of course, exist as to all these grains. The Hessian fly has been more destructive than usual here, and blight has prevailed since the extreme drought and cloudy mornings. The drought, which lasted thirty-two days with very trifling showers not sufficient to lay the dust, affected injuriously pease, early potatoes, and began to operate on Indian corn and grass; but the showers in the latter part of July will probably revive vegetation, and restore the uncommonly good prospects of the early part of the season, and thus make it a year of unusual abundance. Fruits of luxury are to be excepted. The promise and the crops of these, which are past, have been less than usual.

Insects of all sorts have abounded beyond all example. And why not? In years of great abundance, the inferior orders of creation ought to share with us the goodness of Providence.

The Trustees of the Massachusetts Agricultural Society, with a view of giving better accommodation to ingenious artists, who are inventors of machines and implements for agricultural purposes, and of affording a better place to display our domestic manufactures, have called upon the opulent in the capital, to furnish them with funds to erect a suitable edifice for these purposes. This call has been, as usual, answered with a generosity and spirit worthy of the metropolis of a great state, ranking among the first in numbers and opulence, and yielding to none in public spirit and intellectual cultivation. Numbers of the rich have subscribed very liberally, and we now feel assured, indeed we never had doubts, that we shall be able to give more respectability and accommodation at the Annual Cattle Show.

The Trustees have unanimously decided to fix the show at Brighton, though the proprietors of Lechmere's point very liberally tendered them accommodations at that settlement. The greater distance from town, and the consequent accommodation to the country, as well as the avoiding too much bustle and noise, induced the decision.

Marshall, a very celebrated writer on husbandry in England, speaking of the county of Hereford, says, "One circumstance in the management of cattle in this county is matter of some surprise. The spaying of female calves is not here in practice. This circumstance is more remarkable, as the excellency of spayed heifers, not only for draught but as fatting cattle is indisputable; and still more extraordinary, as Herefordshire not being a dairy county, numbers of female calves must every year be fatted for the butcher. How much more eligible it might be, to castrate indiscriminately the handsomest and cleanest of such males or females, not wanted for the purpose of breeding, as drop in rearing season." It would seem from this extract, that the usage of spaying heifers is pretty general in England, or the conduct of the Herefordshire farmers in omitting it, would not have appeared remarkable. We had, indeed, often read of the famous spayed heifers of Norfolk, but did not understand the practice to be general.

Is it ever practised in this state? And with what success? are questions we should wish to have answered.

It certainly would be desirable, that thousands of our miserable milch cows, which, on an average through the year, do not give four quarts of milk per day, were converted into beasts of draught, and fattened, and their places supplied with cows adapted to the dairy. In short, (for we know the objection would be, that there is not fodder enough for both purposes) let us have fewer cows, better fed, and let the superfluous females be spayed, and turned into beef.

Mr. Marshall, next to Arthur Young, one of the most indefatigable and attentive observers of agricultural processes in England, has given, very much in detail, the course of proceeding in all the most celebrated cheese counties of Great Britain. It might be very valuable here (if it was deemed useful there) to give the history of these proceedings at length.

We have certainly advanced more in the quality of our cheese, than in any one article of agricultural produce.

It may be thought, that we shall arrive soon enough at perfection in this art, without foreign information; yet the progress is slow. Experience, undoubtedly, is the best guide. It is what first formed the reputation of the Gloucestershire and North Wiltshire dairies. To this must be added, encouragement from demand and luxury, which decides, and requires, and remunerates industry and care.

Yet in an extensive country, excellent methods in use for the manufacture of a particular article, may be long confined to small districts, without being brought into general use, unless attention is drawn to the subject, and the practices of the best manufacturers made known by publications. This is one of the uses of general societies. We have not room in the present number, now drawing to its close, to insert the practices of the celebrated cheese-makers of Gloucestershire, Cheshire, and North Wiltshire; but it may amuse and awaken the attention of our farmers and dairy women, to have some detached and separate facts stated, from the experience of these celebrated dairy farms.

It seems, that great reliance is put in making the best cheeses, on the *heat* of the *curd*. They are not so particular, Marshall says, as to the heat of the milk when the rennet is put in. Milk (in Gloucestershire) is considered as *too warm*, direct from the cow. If the skim-milk of the last milking is not sufficient to reduce it to the requisite degree of coolness, even cold water is added, though Mr. Marshall condemns this practice.

It is not to be expected, that dairy women will use thermometers to ascertain the degrees of heat in their milk or curd, but it may be useful and curious to state, that experience seems there to have decided, that although the heat may be at eighty-six of Fahrenheit when the rennet is applied, yet it was found that the *curd*, in many repeated experiments, *came precisely* when the heat was at eighty.

The heat of the milk, when the rennet was put to it, varied from eighty-eight to eighty-three, or from ten to fifteen degrees below blood heat; yet, in almost every case, the curd did not come till the heat had fallen to eighty.

There are also varieties in the practice, as to *scalding* the curd; some using whey, others water only, and others whey and water mixed. The same differences of practice occur in the salting. In some of the *best dairies* no salt is used in the curd itself, before it is put into the press; but after it has been partially pressed, the cloth is raised, and salt is applied to the surface, after the cheese had been in the press three hours. In the evening, those made in the morning are again turned, and again salted, in the same manner, by an application of salt to the surface.

This was the practice of two of the most celebrated dairies visited by Mr. Marshall.

We have understood, that one of our most famous cheese-makers in this neighbourhood, whose cheeses are in almost as much reputation here, as the Gloucester cheeses in England, has adopted this mode of salting. If this be an error, we should be glad to be informed, as also to receive any information of the practices of the most successful dairies in our country.

Cheeses in Gloucestershire stand in the press forty-eight hours, which, we believe, is much longer than they generally are suffered to stay with us.

The cheeses are washed in water or whey, after they come out of the press; and it is one test of the solidity of the cheese. Cheeses, rich in quality and well manufactured, sink; if porous, or full of eyes, or hollow, they swim.

By pretty accurate calculations, it has been found that it takes, in Gloucestershire, about one gallon and one third of milk, to make one pound of cheese. In some instances, one gallon to a pound.

Upon an experiment with a dairy of *forty cows*, it was found that, upon an average, the whole being devoted to cheese-making, the cows made each three gross hundred weight of cheese, or 336 net pounds, in a year.

Mr. Marshall allows about four acres of land a year, for the support of a cow, winter and summer.

The quantity of cheese made from a cow, on an average of a whole dairy, seems to exceed, very considerably, what appears from the returns to be made in this state. This is undoubtedly owing, in a great measure, to a greater attention to the selection of good cows, and to their being better fed.

The Secretary of the Treasury, the Hon. Mr. Crawford, sent to the Corresponding Secretary of this Society, some hemp, flax, and saintfoin seed, received by the government from the Consul of the United States at Leghorn. This seed has been distributed, and is now growing in the grounds of some of the Trustees. The hemp and flax appear to be very fine. It was remarked by the Consul, that the Italian hemp and flax were considered superior to any in Europe; at least, that they bore a higher price in that market.

If the birds shall leave any seeds at the end of the season, and it is very difficult to preserve any, when the experiment is made on so small a scale, notice will be given, and the seeds distributed to any publick-spirited gentlemen, who are disposed to take charge of them. In the mean time, the Society deem it a duty to express their grateful sense of the attention of the National Government to the interests of Agriculture.

DESCRIPTION OF A MOULD-BOARD, EXTRACTED FROM A LETTER, DATED MARCH 23d, 1798, FROM MR. JEFFERSON TO SIR JOHN SINCLAIR, PRESIDENT OF THE BOARD OF AGRICULTURE AT LONDON, PRINTED IN THE 4th VOLUME OF THE TRANSACTIONS OF THE AMERICAN PHILOSOPHICAL SOCIETY IN PHILADELPHIA.

In a former letter to you, I mentioned the construction of the mould-board of a plough which had occurred to me, as advantageous in its form, as certain and invariable in the method of obtaining it with precision. I remember that Mr. Strickland of York, a member of your board, was so well satisfied with the principles on which it was formed, that he took some drawings of it; and some others have considered it with the same approbation. An experience of five years has enabled me to say, it answers, in practice, to what it promises in theory. The mould-board should be a continuation of the wing of the ploughshare, beginning at its hinder edge, and in the same plane. Its office is to receive the sod horizontally from the wing, to raise it to a proper height for being turned over, and to make, in its progress, the least resistance possible; and, consequently, to require a minimum in the moving power. Were this its only office, the wedge would offer itself as the most eligible form in practice.* But the sod is to be turned over also. To do this, the one edge of it is not to be raised at all; for to raise this would be a waste of labour. The other edge is to be raised till it passes the perpendicular,

* I am aware, that were the turf to be raised to a given height, in a given length of mould-board, and not to be turned over, the form of least resistance would not be rigorously a wedge with both faces straight, but with the upper one curved, according to the laws of the solid of least resistance described by the mathematicians. But the difference between the effect of the curved and of the plain wedge, in the case of a mould-board, is so minute, and the difficulty in the execution which the former would superinduce on common workmen, is so great, that the plain wedge is the most eligible to be assumed in practice of the first element of our construction.

that it may fall over with its own weight. And that this may be done, so as to give also the least resistance, it must be made to rise gradually from the moment the sod is received. The mould-board then, in this second office, operates as a transverse, or rising wedge, the point of which sliding back horizontally on the ground, the other end continues rising till it passes the perpendicular. Or to vary the point of view, place on the ground a wedge of the breadth of the ploughshare, of its length from the wing backwards, and as high at the heel as it is wide. Draw a diagonal line on its upper face, from the left angle, at the point, to the right upper angle of the heel. Bevil the face from the diagonal to the right bottom edge, which lies on the ground. That half is then evidently in the best form, for performing the two offices of raising and turning the sod gradually and with the least effort: and if you will suppose the same bevil continued across the left side of the diagonal, that is, if you will suppose a straight line, whose length is at least equal to the breadth of the wedge, applied on the face of the first bevil, and moved backwards on its parallel, with itself and with the ends of the wedge, the lower end of the line, moving along the right bottom-edge, a curved plane will be generated, whose characteristic will be, a combination of the principle of the wedge in cross directions, and will give us what we seek, the cross board of least resistance. It offers too this great advantage, that it may be made by the coarsest workmen, by a process so exact, that its form shall never be varied a single hair's breadth. One fault of all other mould-boards is, that, being copied by the eye, no two will be alike. In truth, it is easier to form the mould-board I speak of with precision, when the method has been once seen, than to describe that method either by words or figures. I will attempt, however, to describe it. Whatever may not be intelligible from the description, may be supplied from the model I send you.

Note by the Editor.—We are sensible this is very imperfect without the model or plates; but it may suggest ideas to some of our very ingenious mechanics, who are constantly employed in devising improvements in our agricultural implements.

Brighton, 16th January, 1818.

[To the Corresponding Secretary.]

DEAR SIR,

The specimen of Indian corn exhibited at the meeting of the Trustees, at your house in October, was from the product of an ear, received from Vermout as *a very early variety*. It was planted 29th of May, 1816, and all ripened, when two other sorts, in the same field, were destroyed by the frost. The last season I planted a small patch on a warm soil, and south aspect, the sixth of May; the most forward ears were gathered green, the remainder harvested, full ripe, the 4th of September. Another patch, on a northwest exposure, was planted the 6th of June; the 1st of September the whole was so ripe as to be secure from frost. It was in this same field, with a sort generally planted in this neighbourhood, received the same culture, was equally as productive, and from fifteen or twenty days more forward; the stalks, however, are much more dwarf. Deeming it of importance, that this variety should be disseminated throughout the Commonwealth, I propose, with the approbation of the Trustees, to furnish Mr. Kuhn, the Messenger, with a quantity sufficient to distribute an ear to each member of the Legislature.

I have long been aware, that too much dependence has been placed on our crops of Indian corn, without sufficient attention to the habits of the plant; and apprehend the error to arise from its indiscriminate culture. Were we to select the earliest productive varieties for seed, and plant

only our warm light soils, it may be considered as sure a crop as any; and profitable also, I presume to hint, if connected in a three years' rotation with spring wheat and clover. Do we not err in attempting to keep our dry light soils down to herds'-grass and the natural grasses, for hay and pasture? On such soils, corn may be one of the best preparatory crops for wheat, which delights to follow the high manuring, and deep, clean culture requisite to obtain a good crop of corn; and should the course be pursued of sowing clover with the wheat, to be mown once, and the after growth, in its most succulent state, turned in, would not our lands, of the above description, not only be in a progressive state of improvement, but afford as much fodder as by the system commonly pursued? And the culture of corn, instead of superseding that of wheat, eminently promote it?

I remain, dear Sir, with respect, very cordially yours,

S. W. POMEROY.

CATTLE SHOW, EXHIBITION OF MANUFACTURES, AND PLOUGHING MATCH, AT BRIGHTON, ON TUESDEY AND WEDNDSDAY, THE 13th AND 14th OF OCTOBER, 1818. TO COMMENCE AT NINE O'CLOCK, A. M. ON EACH DAY.

The Trustees of the Massachusetts Society for the Promotion of Agriculture, encouraged by the renewed patronage of the Legislature of this State, intend to offer in Premiums, not only the sum granted by the Government for that purpose, but also the whole amount of the income of their own funds; they, therefore, announce to the public, their wish to have a Cattle Show, and Exhibition of Manufactures, at Brighton, on Tuesday and Wednesday, the 13th and 14th of October, 1818; and they offer the following Premiums:—

FOR STOCK.

For the best Bull, raised in Masssachusetts, of any age, - - - - - - $40
For the next best, do. do. do. - - - 25
For the best Cow, of any age, - - - 40
For the next best do. do. - - - 30
For the next best do. do. - - - - 20
For the best Ox, fitted for slaughter, and weighing not less than 1800 wt. - - - 50
For the next best do. of any weight, - - 40
For the next best do. do. - - - 30
For the best pair of Working Cattle, - - 40
For the next best do. do. - - - 30
For the next best do. do. - - - - 20
For the best Merino Wethers, not less than six in number, - - - - - - 20
For the next best do. do. do. - - - 10
For the best native Wethers, not less than six in number, - - - - - 10
For the next best do. do. do. - - - 5
For the best Merino Ram, - - - 20
For the next best do. - - - - 10
For the best Merino Ewes, not less than five in number, - - - - - - 30
For the next best do. do. - - - 10
For the best Boar, not exceeding two years old, - 15
For the next best do. do. - - - 5
For the best Sows, two in number, not more than four, and not less than one year old, - - 10
For the best Pigs, not less than two in number, not less than four months old, nor more than eight, - 10
For the next best do. do. do. - - - 5
For the best imported Bull, owned, and to be kept in the state of Massachusetts, for at least one year after this Cattle Show, - - - 100

For the next best do. do. do. as above, - - 75
For the best imported Milch Cow, do. as above, 75
For the next best do. do. do. - - - 50

No animal, for which to any owner one premium shall have been awarded, shall be considered a subject for any future Premium of the Society, except it be for qualities different from those for which the former premium was awarded.

Any of the above stock (Wethers excepted) when raised and still owned at the time of exhibition, by the person who raised them, will entitle the claimant to an allowance of ten per cent. in addition.

FOR AGRICULTURAL EXPERIMENTS.

To the person who shall raise the greatest quantity of Wheat, on an acre, - - - $40
To the person who shall raise the greatest quantity of Carrots, on an acre, - - - - 30
To the person who shall raise the greatest quantity of Potatoes, on an acre, - - - 30
To the person who shall raise the greatest quantity of Turnips, on an acre, - - - - 30
To the person who shall raise the greatest quantity of any other Vegetable, suitable for the winter food of animals, and which shall equal in quantity, per acre, the greatest premium product, in this state, of either of the three preceding Vegetables, 30
To the person who shall introduce any Grass, not before cultivated in this state, and prove, by actual experiment, and produce satisfactory evidence of its superiority to any now cultivated, - 30
To the person who shall give satisfactory evidence on "Soiling Cattle," not less than six in number, and through the whole season, together with a particular account of the food given, and how cultivated, - - - - - - - 30

To the person who shall make the experiment of turning in green crops as a Manure, on a tract not less than one acre, and prove its utility and cheapness over any other manure, giving a particular account of the process, and its result, - - 30

To the person who shall, by actual experiment, prove the best season and modes of laying down lands to grass, whether spring, summer, or fall seeding be preferable, and with or without grain, on different soils, - - - - - 30

To entitle himself to either of the Premiums, under this head of Agricultural Experiments, the person claiming, must cultivate a tract of at least one acre in one piece, with the plant or production for which he claims a premium; and must state, in writing, under oath of the owner, and of one other person (accompanied by a certificate of the measurement of the land, by some sworn surveyor) the following particulars:—

1. The state and quality of the land, in the spring of 1818.
2. The product, and general state of cultivation and quantity of manure, employed on it the year preceding.
3. The quantity of manure used the present year.
4. The quantity of seed sown.
5. The times and manner of sowing, weeding and harvesting the crop, and the amount of the product, ascertained by actual admeasurement of the whole produce for which a premium is claimed.

The claim must be entered on the days hereinafter established for entering for the Premiums; but the evidence of the actual product need not be produced until after the Cattle Show, and at any time preceding the first day of the ensuing December: the Trustees not intending to decide upon claims, under the head of Agricultural Experiments, until their meeting in December.

FOR INVENTIONS.

To the person who shall invent the best, simplest, and least expensive Machine for threshing Wheat, or any small Grains, - - - - $75

To the person who shall invent the best, simplest, and least expensive Machine for sowing small Seeds on an extensive scale, - - - 30

To the person who shall exhibit the best Plough, for common purposes, of an improved construction, and of his own invention, - - - 20

To the person who shall use the Drill Plough, or Machine, and apply it most successfully to the cultivation of any small Grains or Seeds, on a scale not less than one acre, - - - - 20

To the person who shall produce at the Show any other Agricultural Implement of his own invention, which shall, in the opinion of the Trustees, deserve a reward, - - - - - - 20

In all cases, proof must be given of the work done by the Machine, before it is exhibted; and of its having been used and approved by some practical farmer.

It is not the intention of the Society to grant a premium for any *patented implement*, unless the proprietor surrender said patent right to the Society, for the use of the state of Massachusetts, for an additional sum not exceeding the amount of premium.

FOR DOMESTIC MANUFACTURES.

To the person or corporation who shall produce the best specimen of fine Broadcloth, not less than 1 5-8th yards wide, exclusive of the list, 40 yards in quantity, and dyed in the wool, - - - $ 30

For the best second do. do. do. - - - 20

For the best superfine Cassimere, not less than 3-4th yard wide, nor less than 40 yards in quantity, - 15

For the second best do. do. do. - - - - 10
For the best superfine Satinet, 3-4th yard wide, not less than 50 yards, - - - - - - - 10
For the second best do. do. do. - - - - 6
To the person or corporation, who shall produce the best specimen of Cotton Cloth, manufactured in this state, not less than 50 pieces, - - - 20
To the person who shall produce the best specimen of any other fabrics of Cotton, manufactured in this state, in public factories, not less than 50 pieces, - - - - - - - - - 20
In private families, not less than five pieces, - 20

FOR HOUSEHOLD MANUFACTURES.

For the best Woollen Cloth, 3-4ths yard wide, not less than 20 yards in quantity, - - - - $ 12
For the second best do. do. - - - - - 8
For the best double milled Kersey, 3-4ths wide, not less than 20 yards in quantity, - - - 12
For the second best do. do. - - - - 8
For the best Coating, 3-4ths yard wide, and not less than 20 yards in quantity, - - - - - 8
For the second best do. do. - - - - 6
For the best Flannel, 7-8ths yard wide, not less than 45 yards in quantity, - - - - - 10
For the second best do. do. - - - - 7
For the best do. 4-4ths yard wide Carpeting, not less than 30 yards in quantity, - - - 15
For the second best do. do. - - - - 7
For the best 5-8ths yard wide Stair Carpeting, not less than 30 yards in quantity, - - - - 10
For the second best do. do. - - - - 7
For the best pair of Blankets, not less than 8-4ths wide and 10-4ths long, - - - 6
For the second best do. do. - - - 4
For the best Woollen Knit Hose, not less than 12 pair in number, - - - 5

For the second best do. do. - - - 3
For the best Men's Half Hose (woollen) not less than 12 pair in number, - - - - 4
For the second best do. do. - - - 2
For the best Men's Woollen Gloves, not less than 12 pair in number, - - - - 5
For the second best do. do. - - - 3
For the best Linen Diaper, 5-8ths yard wide, and not less than 30 yards in quantity, - - 5
For the second best do. do. - - - 3
For the best 4-4ths yard Diaper (for table linen) not less than 30 yards in quantity, - - 10
For the second best do. do. - - - 5
For the best specimen of Sewing Silk, raised and spun in this state, of good fast colours, not less than one pound, - - - - - 5
For the second best do. do. - - - 3
For the best Linen Cloth for Shirting or Sheeting, one yard wide, and 25 yards long, - - - 8
For the second best do. do. - - - - 4

All the above Manufactures, when of wool or flax, must be of wool or flax of the growth and manufacture of the state of Massachusetts. And all Manufactures, when presented, must have a private mark.

For the best Butter, not less than five tubs, nor less than 50 pounds each, - - - $10
For the second best do. do. do. - - - 5

It is understood, that whenever, merely from a want of competition, any of the claimants might be considered entitled to the Premium, under a literal construction, yet if, in the opinion of the Judges, the object so offered is undeserving of any reward, the Judges shall have a right to reject such claims.—Persons to whom Premiums shall be awarded, may, at their option, have an article of Plate, with suitable inscriptions, in lieu of money. Premiums will be paid within ten days after they shall be awarded.

The Trustees of the Massachusetts Society for Promoting Agriculture, hereby give notice, that they intend, on the second day of the Cattle Show, viz. on the fourteenth day of October next, to give Premiums to the Owners and Ploughmen of the three Ploughs, which shall be adjudged, by a competent Committee, to have performed the *best work with the least expense of labour*, not exceeding half an acre to each Plough, and of such depth as the Committee shall direct.

The first Plough,	$ 20	Second Plough,	$ 12
Ploughman,	10	Ploughman,	6
Driver,	5	Driver,	3

Third Plough,	$ 8
Ploughman,	4
Driver,	2

In each case, if there be no Driver, both sums to be awarded to the Ploughman.

The persons engaging in the Ploughing Match, must own their respective Ploughs, and Cattle; and the Ploughman, (if he be not the owner) must be a man employed on the owner's farm.

The persons intending to contend for the Prizes, must give notice in writing to S. W. Pomeroy, or Gorham Parsons, Esquires, of *Brighton*, on or before the first day of October, so that proper arrangements may be made for the purpose. No person will, on any consideration, be admitted without such notice. The competitors will also be considered as agreeing to follow such rules and regulations as may be adopted by the Committee appointed on the subject. The Ploughs to be ready to start at nine o'clock, A. M.

The result of the last Ploughing Match at Brighton, and the satisfaction expressed by so many of their Agricultural brethren, will induce the Society to continue these Premiums annually, in connexion with the Cattle Show, as an

efficacious means for exciting emulation and improvement in the use and construction of the *most important instrument* of Agriculture.

Persons intending to offer any species of Stock, or any Article or Experiment whatever, for Premium, are requested to give notice thereof, either by letter (post paid) stating the Article or Experiment, or to make personal application to Mr. JONATHAN WINSHIP, at *Brighton*, on or before the twelfth day of October, and requesting him to enter such notice or application, so that tickets may be ready at nine o'clock of the thirteenth. No person will be considered as a competitor, who shall not have given such notice, or made such application for entry, on or before the time above specified.

The applicants will be held to a rigid compliance with this rule relative to entries, as well as to the other rules prescribed.

The examination of every species of Stock (except Working Oxen) and of Domestic and Household Manufactures, will take place on the thirteenth; and the trial of Working Oxen, examination of Inventions, and Ploughing Match, on the fourteenth of October.

By order of the Trustees,

JOSIAH QUINCY,

Chairman of Committee of Premiums.

OFFICERS OF THE SOCIETY FOR 1818.

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Samuel W. Pomeroy, Esq. 1*st Vice-President.*
Thomas L. Winthrop, Esq. 2*d Vice-President.*
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John Lowell, Esq. *Corresponding Secretary.*
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Benjamin Guild, Esq. *Assistant Recording Secretary.*

Trustees.

Hon. P. C. Brooks,	S. G. Perkins, Esq.
Hon. John Welles,	Gorham Parsons, Esq.
Hon. Josiah Quincy,	E. Hersey Derby, Esq.

LIST OF MEMBERS, ELECTED SINCE JANUARY, 1817.

Hon. William Abbot,	Castine.
Benjamin Ashley, Esq.	W. Springfield.
Mr. Timothy Allyne,	do.
John Atkins, Esq.	Natick.
Major Chester Adams,	Needham.
Gen. Jacob Bliss,	Springfield.
Mr. Oliver Bass,	W. Springfield.
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John Bellows, Esq.	do.
Mr. John Baker,	do.
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Dr. E. D. Cushing,	Boston.
Capt. Isaac Cook,	Brookline.
Capt. Joseph Curtis,	Roxbury.
Nathaniel Chandler, Esq.	Petersham.
Mr. Saml. F. Coolidge,	Boston.
Rev. Henry Coleman,	Hingham.
Mr. Edward Cruft,	Boston.
Col. ——— Chapin,	Springfield.
Capt. Richard Crowninshield,	Danvers.
Mr. S. G. Derby,	Weston.
Mr. Isaac Davenport,	Milton.
Mr. Isaac Davis,	Roxbury.
Jonathan Dwight, Esq.	Springfield.
Jonathan Dwight, Jun. Esq.	do.

Mr. Jonathan Dorr,	Roxbury.
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Robert Emery, Esq.	Springfield.
Mr. Daniel Emery,	
Justin Ely, Esq.	W. Springfield.
Mr. John B. Fitch,	Boston.
Gen. T. M. Forman,	State of Maryland.
Mr. Joshua Frost,	Springfield.
Mr. William Flagg,	Durham, N. H.
Abraham F. Fuller, Esq.	Boston.
Major W. Fernald,	Charlestown.
Hon. S. P. P. Fay,	Cambridge.
Mr. Saml. Flagg, Jun.	Worcester.
Benjamin Guild, Esq.	Boston.
Capt. Saml. Hyde,	Newtown.
Gen. James Humphries,	Athol.
Saml. Hammond, Esq.	Brookline.
Dudley Hall, Esq.	Medford.
Mr. Jonathan Hodges,	Salem.
Rev. Bezaliel Howard,	Springfield.
Mr. Daniel Hastings,	Newtown.
Jonas Howe, Esq.	Rutland.
Lewis Hunt, Esq.	Northampton.
Mr. Geo. Hubert,	Ellsworth.
Mr. James Humphries,	Dorchester.
*Hon. Elihu Hoyt,	Deerfield.
Leonard Jarvis, Esq.	Surry.
Mr. Charles Jarvis,	Ellsworth.
Mr. William Jackson,	Newtown.
Mr. Ruggles Kent,	W. Springfield.

* The name of the Hon. Mr. Hoyt was omitted in a list published in a former No. although he was then a member.

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Mr. Isaac W. Locke,	W. Cambridge.
Mr. Robert Lapist,	Bangor.
Isaac Lyman, Esq.	York.
Levi Lincoln, Jun. Esq.	Worcester.
Luther Lawrence, Esq.	Groton.
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Israel Monroe, Esq.	Boston.
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Mr. Abijah Northey,	do.
Francis J. Oliver, Esq.	Boston.
John Osgood, Esq.	Salem.
Saml. Orne, Esq.	do.
Hon. Dudley L. Pickman	do.
Capt. Jonathan Parsons,	W. Springfield.
Oliver Putnam, Esq.	Boston.
James Perkins, Esq.	do.
Hon. Thomas H. Perkins, Esq.	do.
Hon. John Phillips,	do.
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William Parsons, Esq.	Boston.
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Mr. Abijah White,	Watertown.
Mr. Davis Whitman,	Lancaster.
Thomas Williams, Esq.	Roxbury.

HONOURARY MEMBERS, ELECTED SINCE JANUARY, 1817.

James Wadsworth, Esq.	Canandaigua, N. Y.
Herman Le Roy, Esq.	New York.
Hon. Rufus King,	do.
John Treadwell, Esq.	Long Island.
Hon. Charles Atherton,	Amherst, N. H.
Mons. Lair, Secretary of the Agricultural Society of	Caen in France.
Hon. Nathaniel Gilman,	Exeter, N. H.

END OF NUMBER II.—VOLUME V.

New and elegant American Atlas.

WELLS and LILLY, No. 97, Court Street, have been appointed sole Agents for receiving subscriptions for an Elegant Atlas, now publishing in [illegible]nia: ☞First No. of which is received, [illegible]e seen at No. 97, Court Street.

[illegible]merous collections of Maps of this country have been published, [illegible]ompleted on a scale and plan calculated to convey an adequate [illegible] or to do justice to the improved state of Geographical Sci- [illegible] States. Those heretofore offered to publick approbation have [illegible] essays of this kind, and principally designed for the use of [illegible] geographical works; while those published in Europe are [illegible] and incorrect as respects the United States. Indeed our [illegible]dly progressive, that no European publication can keep pace [illegible]nt and the extension of our settlements. The subject must [illegible]ity in our own country; and, such is now the respectable [illegible]e that we can assert with confidence that we possess the ma- [illegible]cient to exhibit a topographical representation of the United [illegible] superiour, as it regards correctness and detail, and every way [illegible] European publication of the kind.

[illegible] this work have been collecting materials, preparatory to the [illegible], for several years, in which they have been assisted by some of the [illegible] geographers in this country and in Europe. In addition to this, they will have access to the very valuable materials in the publick offices of the general and state governments, to enable them to execute the proposed Atlas in a manner calculated to exhibit the progress of improvement in our country.

In the arrangement of geographical works, it usual to give a general view of the world, representing in detail that part of it most interesting to those for whom the publication is intended. In compliance with this rule, the publishers propose that it shall consist of the following maps:

The World, one sheet;—America, one; Europe, one; Asia, one; Africa, one; North America, four; South America, two; United States, which will be comprised in nine sheets, and drawn on a uniform scale as follows; Maine, New-Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island, one sheet; New York, one; New-Jersey and Pennsylvania, one; Delaware, Maryland and Virginia, one; Ohio and Indiana, one; Kentucky and Tennessee one; North Carolina and South Carolina, one; Georgia and Alabama, one; Louisiana and Mississippi, one; and the title:—in all 21 sheets.

The materials for the general maps were selected and arranged by J. H. Eddy, from the latest and best European authorities, and exhibit a correct view of the world, in connexion with the United States. The state maps will be engraved from drawings compiled, as far as practicable, from original documents, on a scale sufficiently large to admit of a complete representation of the surface of the country, the seas, lakes, rivers and mountains, with their subdivisions; the cities, towns, and villages, and all the principal roads, with the distances between important places.

In the execution of such an extensive plan, very great expense must be incurred, but the utility of a work calculated to enable every citizen of the United States to become intimately acquainted with the geogaraphy of his country being evident, the publishers have entered on their task with full confidence on the importance and merits of the work to ensure the patronage necessary to its completion.

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